MODEL AIRPLANE NEWS

12th Year of Publication

OCTOBER, 1940

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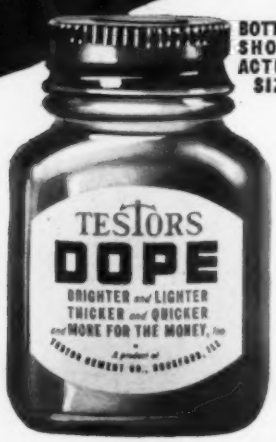

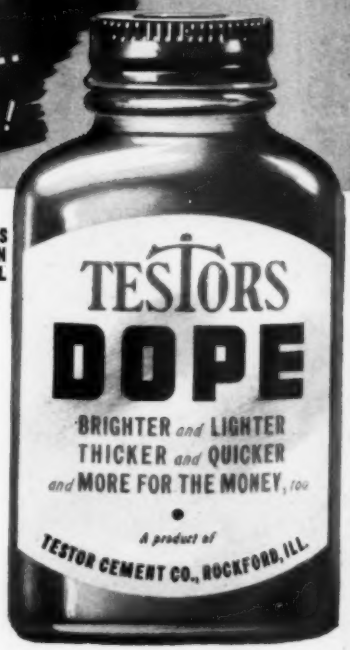

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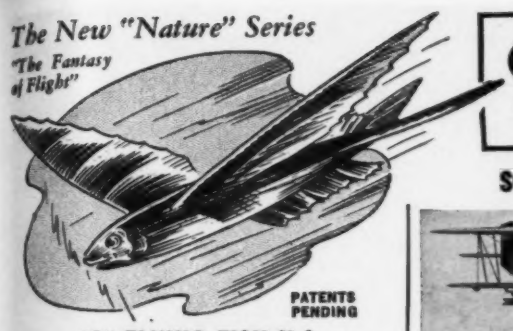

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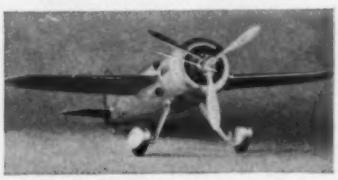

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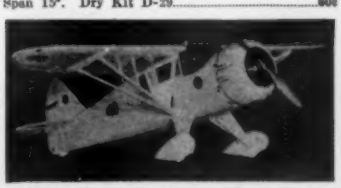

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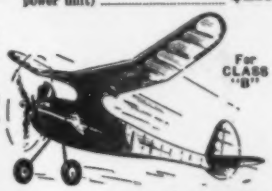

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Model AIRPLANE News

12th YEAR OF PUBLICATION

Vol. XXIII *No. 4*

Edited by Charles Hampson Grant

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The kit has the completeness of all BERKELEY Kits, including: Silkspan covering and BERKELEY Time-Air Flight Timer.

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Designed by Leon Shulman

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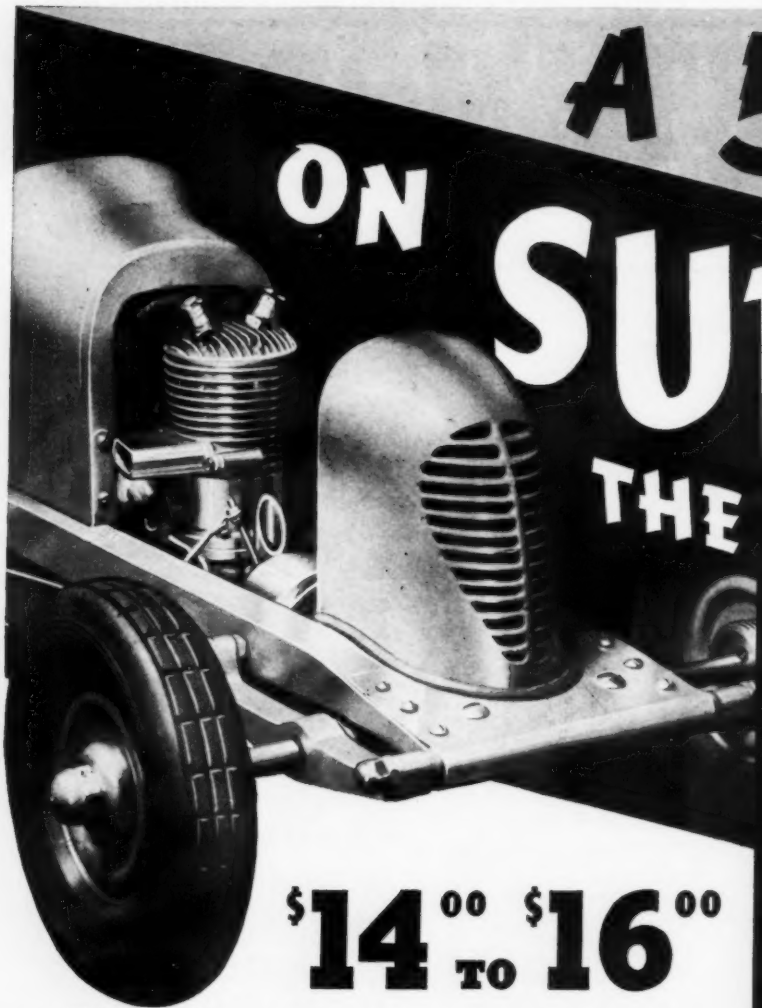

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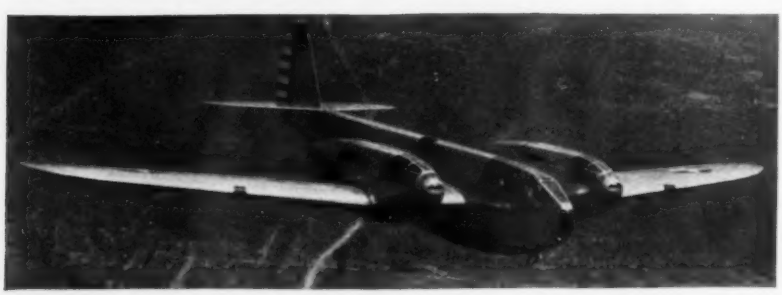
MARS MOLDS THE

By ROBERT C. MORRISON

NOW that a million or more people have been killed in the last few months, that all Europe is in turmoil and that the world as a whole is about to be engulfed in the magnanimity of strife, the politicians in Washington, D. C., have come to realize the true power, value and perfection of . . . may be generalize, AVIATION. It has taken all that to prove that the airplane is HERE and is not "the coming thing." Somebody should organize a committee to ascertain that anyone making the remark hereafter that "aviation is the coming thing" be given a water pistol and put up on the front line of whatever country is fighting the Germans at that time.

British "carriers" are equipped with these new Albercores. 3 seater "spotters" (B.C. Photo)



This new 2000 h.p. Bell YSM-1 carries six guns, bombs and a crew of three.

Unfortunate is the fact that it has taken nothing less than war to make the public understand that the airplane is not an experimental toy, that it is not unsafe and that it is now the American people's greatest assurance of continued liberty. In spite of the efforts of those in the aviation industry, who understand the airplane, to assure the public that airplanes are a reliable means of transportation, the public's ignorance of the airplane and its principles of flight, etc., have hindered the progress of aviation for lo, these many years. In spite of this the industry has kept plugging through the most adverse conditions imaginable and now, in the advent of war, it has suddenly jumped from America's 27th most important industry to 12th on the list . . . and still rising!

With our government now in quest of 50,000 airplanes at a time, with a world quota figuring well up in the hundred thousands, is it not sufficient proof that the airplane is very practical? Not only can they land in the same peaceful manner in which they took off an infinite number of times, but they can go through an entire war, even have shells and bullets

In the Douglas Factory, 1800 employees move bombers down the production line at a fast pace.

The latest North American Primary trainer NA-35 with an in line engine; a sturdy all metal low wing ship recently released for active service

German fighter bombers en route to participation in the battle of Sedan (Acme)

AIRPLANE

How Front Line Flying Experience is Modifying The Design and Use of War Planes.

How the latest Northrop fighter N-3 will appear. It mounts five machine guns, one cannon and carries 2000 lbs. of bombs. Its high speed is 306 m.p.h.

pierce their wings or have one of their engines blown clear off and still be able to reach their home base intact! This has happened many times in the present war.

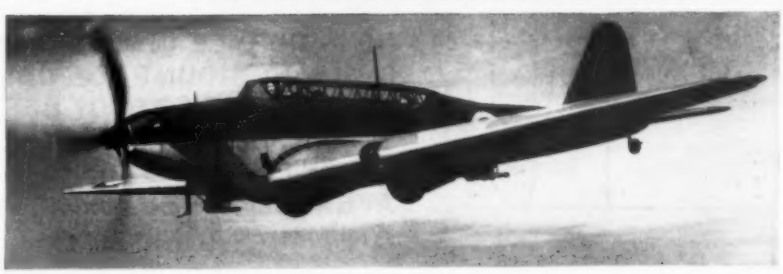
Though the airplane must be employed by warlike means to change the destinies of peoples at the moment its potentialities in a peaceful world are manifold, the airplane, as such, will shorten distances greatly, will give a person greater opportunities of seeing the world, and will have a most important role in changing the habitudes of people. It is true that the airplane, because of the distance it can cover in a short period of time, has made the presence of so many small countries scattered throughout Europe impractical. Of course no one knows what the future may bring, but if Europe finally becomes just Germany and Russia, this geographical change will be ideal for the airplane, for it will be able to go from one end of the continent to the other without having to go through so much "red tape" as when the land was divided into so many small countries. However, the airplane was destined to bring these countries together at some date in the future by mutual agreement of the people. Hitler could have accomplished this by peaceful means, though it would have taken considerably longer than by his forceful methods, and it probably would have been concluded after his time. But since it has been war and not peace we will have to look at the airplane as a weapon to exterminate the evil instead of one creating greater welfare throughout the world.

Getting down to the basic facts, it has been the engineer who has created the airplane, has thought out the means by which it flies, has put strength into its structure and has devised means for producing them in great quantities. The exploits of Hitler and his equally notorious partner, Musso-

(Continued on page 62)

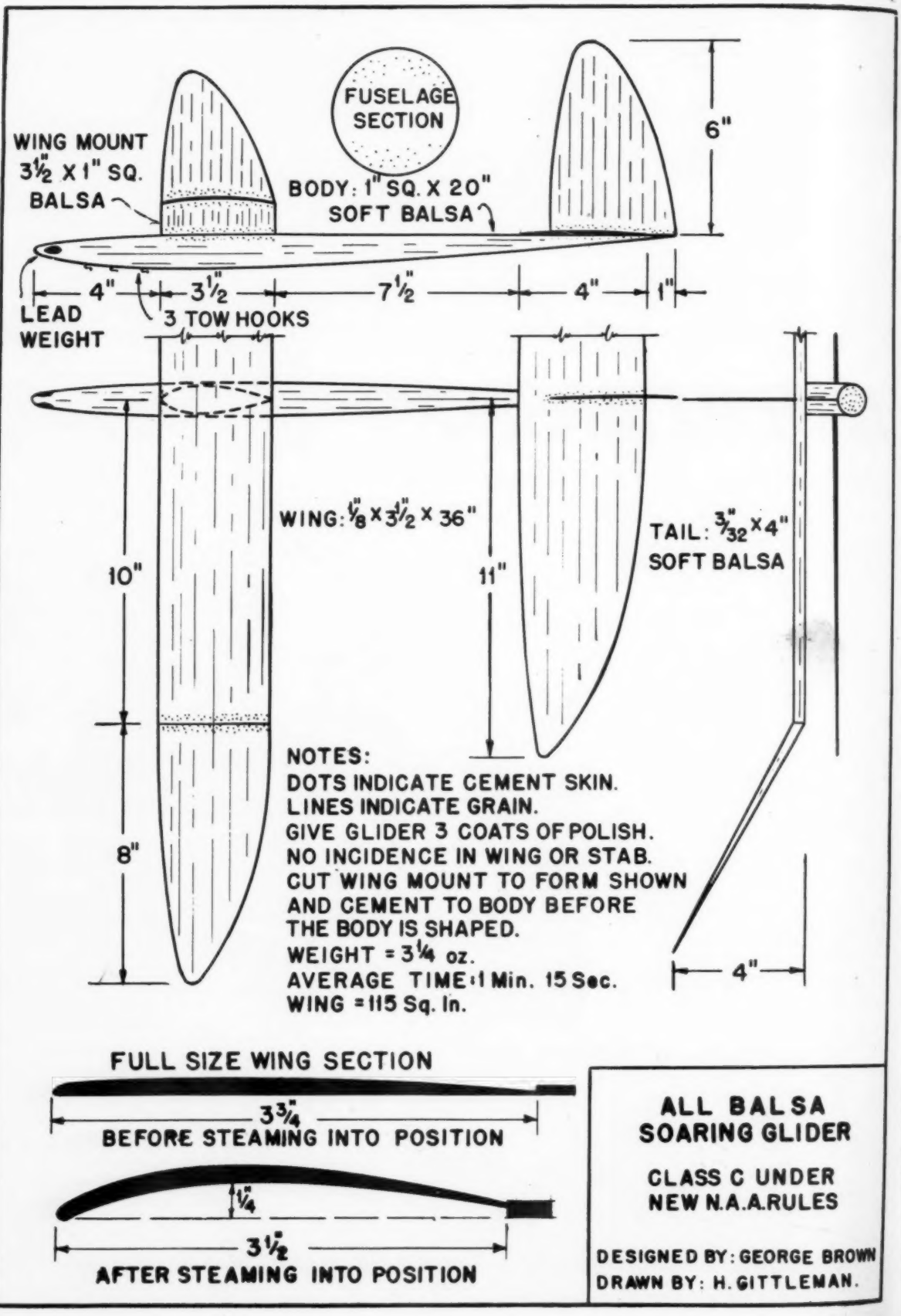
The Italian Piaggio P. XIR. C 40, 2000 h.p. and 270 m.p.h. high speed

A Fairey "Battle" on way to bombing practise over the sea (Acme)



The North American AT-6 advanced trainer with retractable landing gear and radial engine. The crew is enclosed in this type

Twenty-five fully equipped troops line up before boarding the new stratoliner for a flight (Acme)


FUSELAGE SECTION
WING MOUNT 3½" X 1" SQ. BALSA
BODY: 1" SQ. X 20" SOFT BALSA
6"
4"
3½"
7½"
4"
1"
LEAD WEIGHT
3 TOW HOOKS
WING: ⅛" X 3½" X 36"
TAIL: 3/32" X 4" SOFT BALSA
10"
11"
8"
4"
NOTES:
DOTS INDICATE CEMENT SKIN.
LINES INDICATE GRAIN.
GIVE GLIDER 3 COATS OF POLISH.
NO INCIDENCE IN WING OR STAB.
CUT WING MOUNT TO FORM SHOWN AND CEMENT TO BODY BEFORE THE BODY IS SHAPED.
WEIGHT = 3¼ oz.
AVERAGE TIME: 1 Min. 15 Sec.
WING = 115 Sq. In.
FULL SIZE WING SECTION
3¾"
BEFORE STEAMING INTO POSITION
¼"
3½"
AFTER STEAMING INTO POSITION
ALL BALSA SOARING GLIDER
CLASS C UNDER NEW N.A.A. RULES
DESIGNED BY: GEORGE BROWN
DRAWN BY: H. GITTLEMAN.

Fundamentals of Gas Model Engines

How the Explosive Mixture and the Spark is Produced

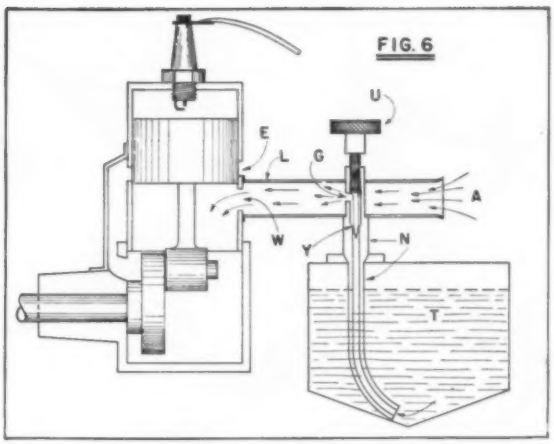
By CHARLES HAMPSON GRANT **PART 2**

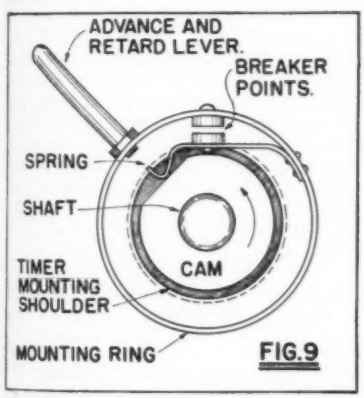
IN THE preceding article of this series, the basic principles of gasoline engine operation were explained. What took place after the explosive mixture entered the cylinder and the manner in which power was generated was clearly indicated. However, other supplementary units are required:

One to create the proper explosive mixture of gas and air which is drawn into the cylinder: Another to generate the electric current that produces the spark for igniting the explosive mixture in the cylinder: and a third which distributes the current to the spark plug so at the proper instant the spark will jump across the points or electrodes of the plug.

The Mixing Valve

The device commonly used to create the gas-air mixture is called a mixing valve, Figure 6. Gasoline, mixed with oil for lubricating purposes is contained in tank "T." "A" is the air intake opening. When the piston rises in the cylinder a low pressure or suction is created within the crank case of the engine. Approaching the top of its stroke, the piston moves up past the crank case intake port "W," creating a passage-way from the intake tube of the mixing unit into the crank case. Thus the suction in the crank case is transmitted through port "W" to the intake tube "L" which causes air to rush into the tube through the opening "A." The pipe "N," the lower end of which is in the bottom of the gas tank, passes up through the air intake tube "L." There is a small opening "G" in the left side of the pipe within the tube "L." When the adjusting screw "U" is screwed upward, its sharp end is raised from the seat of the valve "Y" allowing free passageway from the tank up through the pipe to the opening "G." Now as the air rushes in to the open end "A" of the tube "L," it passes around the pipe "N" within the tube. This causes a suction at the opening "G" in the rear of the pipe. The vacuum in the crank case and in the tube "L" induces this suction. Thus the gas is drawn from the tank "T" through the pipe "N" and out of the hole "G." As it passes out of the hole the suction breaks up the liquid into a fine spray which mixes with the air being drawn through the tube "L" from "A." Thus by the time the gas and air reach the crank case port "W" it has become an explosive mixture. The amount of gas that flows out of the hole "G" may be regulated by the adjusting screw "U." The more that it is screwed upward raising the point of the valve screw "U" from the valve seat "Y," the more gas passes upward from the tank. By turning this screw downward, the opening in the pipe may be entirely closed thus shutting off the gas. This is the simplest form of mixing valve and one which is commonly used on small two cycle model plane motors.



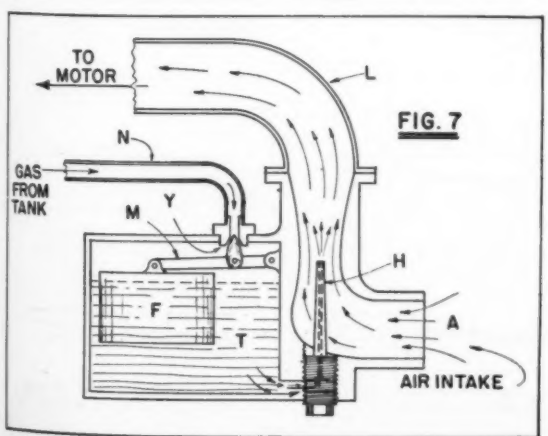


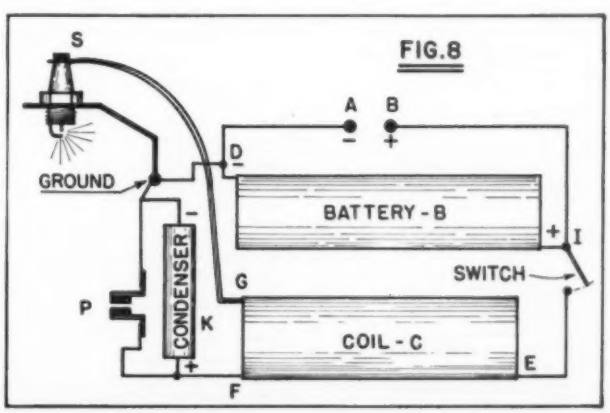
The Carburetor

Some engines are equipped with carburetors. This is a device to which a supply of gas is fed from an auxiliary gas tank, this supply being shut off by a valve when the gas in the carburetor reaches a certain level. By keeping the gas at this definite level the proportion of gas to air in the mixture is the same at all times and the same volume of gas is drawn into the engine. In the case of the mixing valve, as gas is drawn from the tank "T" the level of the gas drops gradually. In this case greater suction is required to draw the gas from the tank when it is at a low level than when the tank is full because the gas must be drawn upward through the tube "N" a greater distance. This causes the gas-air mixture to change slightly. If the change in the gas level is large the mixture changes to such a degree that the engine will not function.

Figure 7 shows a typical carburetor. "N" is the pipe leading from the gas tank to the carburetor. "Y" is the valve

(Continued on page 70)





Copyright 1940 by Charles Hampson Grant

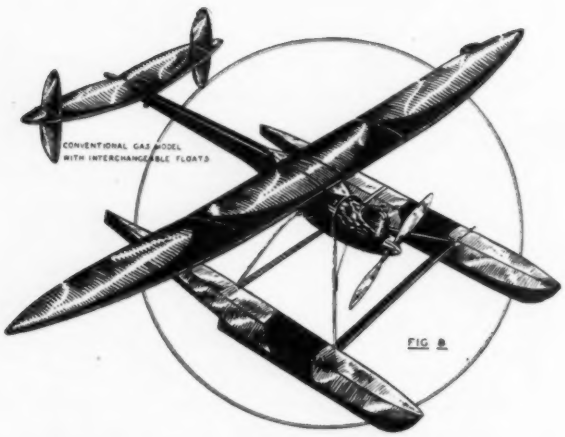


FIG. 8

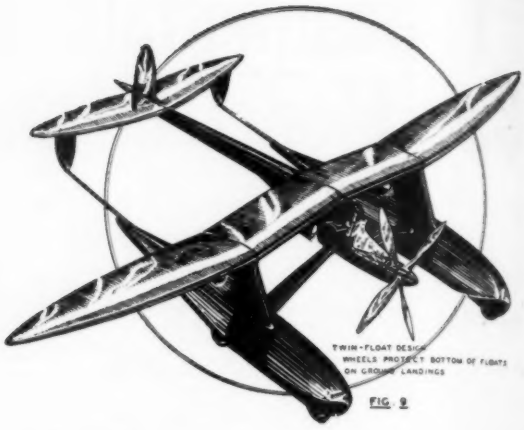


FIG. 9

SEAPLANE POINTERS

IT IS A beautiful summer day, with clouds and a blue sky mirrored in the calm surface of a lake, a lake disturbed only at its margin where a slight breeze creates ripples reflecting the sunlight in millions of ever-changing, dancing spears of light. It is a day created for sport and for fun, a perfect day for the Model Aeronuts' Club to test the creations of two of its enthusiastic designers—two graceful models resting on the water near one shore, engines idling smoothly and evenly.

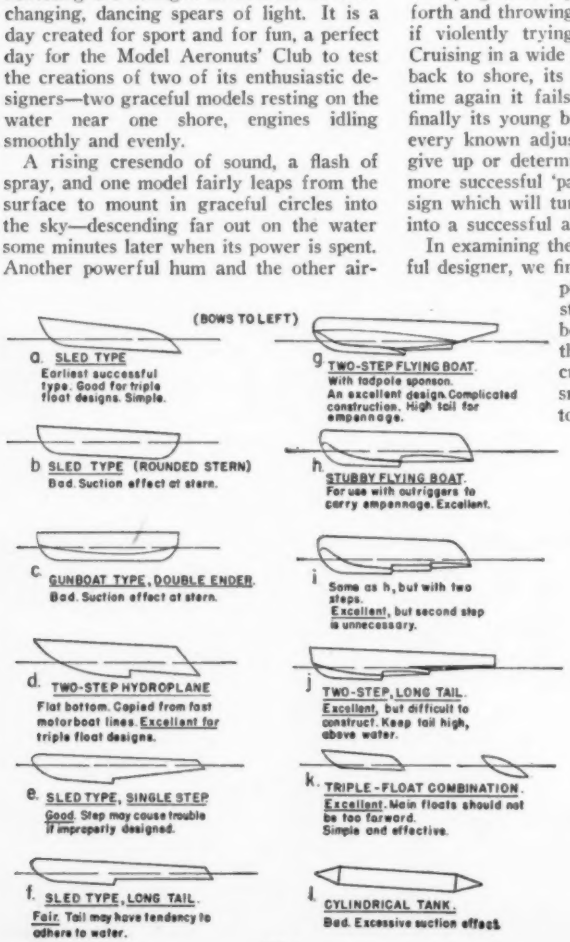
A rising cresendo of sound, a flash of spray, and one model fairly leaps from the surface to mount in graceful circles into the sky—descending far out on the water some minutes later when its power is spent. Another powerful hum and the other airplane flashes in the wake of its sister; but the hum of the motor alternates with an angry buzz as some invisible force seems to hold the plane to the water. The plane slowly gathers speed, rocking back and forth and throwing wide sheets of spray as if violently trying to shake itself loose. Cruising in a wide semicircle, it finally taxis back to shore, its power spent. Time and time again it fails to achieve flight; until finally its young builder, having exhausted every known adjustment, either decides to give up or determines to extract from his more successful 'pardner' the secret of design which will turn his winged motorboat into a successful airplane.

In examining the floats of our unsuccessful designer, we find a beautifully designed piece of work with curves, streamlined sides, "V" bottom, a step located on the bottom and a profile curving gently and smoothly on all surfaces to a point in the rear. It is an aerodynamically perfect float designed to offer the least amount of resistance to the airstream, but it is also grossly unfit for successful take-offs and planing on the surface of the water. The float conforms faithfully to all accepted theories of aerodynamics, yet it is a failure. Why?

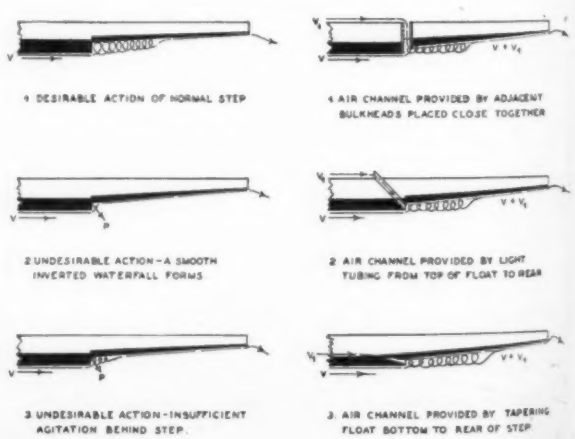
What are the factors contributing to the successful design and construction of an efficient float, a float not only aerodynamically but also hydrodynamically efficient and strongly constructed? No landing gear float, wheel, or ski can be successful if i merely looks good and supports the airplane but fails in its function of permitting constant and safe take-offs and landings. The theory of seaplane model design is very simple and can be learned and applied by the average young model builder with little or no resort to mathematical formulae or calculation.

Theory of Take-off

At rest, all floats, whether displacement or non-displacement types, adhere strongly


(BOWS TO LEFT)
a. SLED TYPE
Earliest successful type. Good for triple float designs. Simple.
b SLED TYPE (ROUNDED STERN)
Bad. Suction effect at stern.
c. GUNBOAT TYPE, DOUBLE ENDER.
Bad. Suction effect at stern.
d. TWO-STEP HYDROPLANE
Flat bottom. Copied from fast motorboat lines. Excellent for triple float designs.
e. SLED TYPE, SINGLE STEP
Good. Step may cause trouble if improperly designed.
f. SLED TYPE, LONG TAIL.
Fair. Tail may have tendancy to adhere to water.
g TWO-STEP FLYING BOAT.
With tadpole sponson.
An excellent design. Complicated construction. High tail for empennage.
h STUBBY FLYING BOAT.
For use with outriggers to carry empennage. Excellent.
i
Same as h, but with two steps.
Excellent, but second step is unnecessary.
j TWO-STEP, LONG TAIL.
Excellent, but difficult to construct. Keep tail high, above water.
k. TRIPLE-FLOAT COMBINATION.
Excellent. Main floats should not be too forward.
Simple and effective.
l. CYLINDRICAL TANK.
Bad. Excessive suction effect.
FIG. 6.

STEP ACTION


1 DESIRABLE ACTION OF NORMAL STEP
1 AIR CHANNEL PROVIDED BY ADJACENT BULKHEADS PLACED CLOSE TOGETHER
2 UNDESIRABLE ACTION - A SMOOTH INVERTED WATERFALL FORMS
2 AIR CHANNEL PROVIDED BY LIGHT TUBING FROM TOP OF FLOAT TO REAR
3 UNDESIRABLE ACTION - INSUFFICIENT AGITATION BEHIND STEP.
3 AIR CHANNEL PROVIDED BY TAPERING FLOAT BOTTOM TO REAR OF STEP
FIG 4

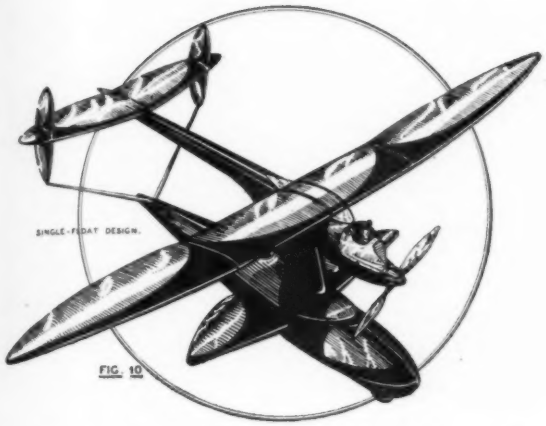


FIG. 10

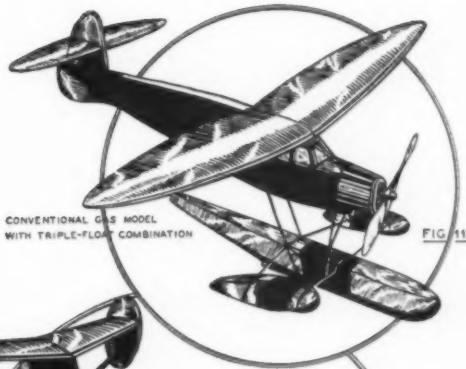


FIG. 11A

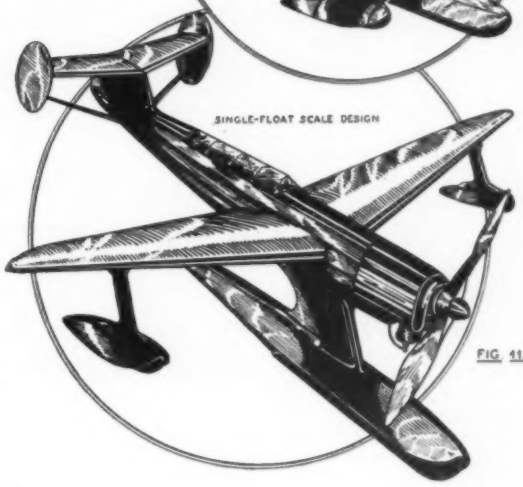


FIG. 11B

Practical Suggestions That Will Enable You To Create Efficient Seaplanes Of Many Different Designs

By ROGER F. PARKHILL

to the surface of the water with the full force of gravity equal to the weight of the plane acting downward through a point on the float to the rear of the center-of-gravity of the plane. Because of their bulk displacement types are not now used as floats; however, non-displacement types, as universally used at present, are light-weight and lie on the surface with their rear only slightly submerged. On a take-off, as the plane gathers speed, the pressure point moves forward, the rear of the float rises from the water, the line of thrust becomes horizontal and the floats plane on their step and foresurface. At this point, the pressure of upward lift generated by the wings can be said to equalize the force gravity now acting downward through the float at a point slightly forward of the step. The float has now reached its "planing" or "getaway" speed, and a moment later, when the lift overbalances the strength of gravity, the airplane breaks cleanly away from the water and climbs. On a gas model with a well-designed pair of floats, the whole take-off action should take place in a space of six feet or less. Fig. 1 illustrates the various steps during the take-off procedure of a conventional monoplane.

"Suction" Effect

If, however, the take-off distance is excessive, or the plane fails entirely to take-off, the fault may be due to "suction effect." As the plane gathers speed the forces acting downward on a poorly-designed float may increase instead of decrease; the force of gravity

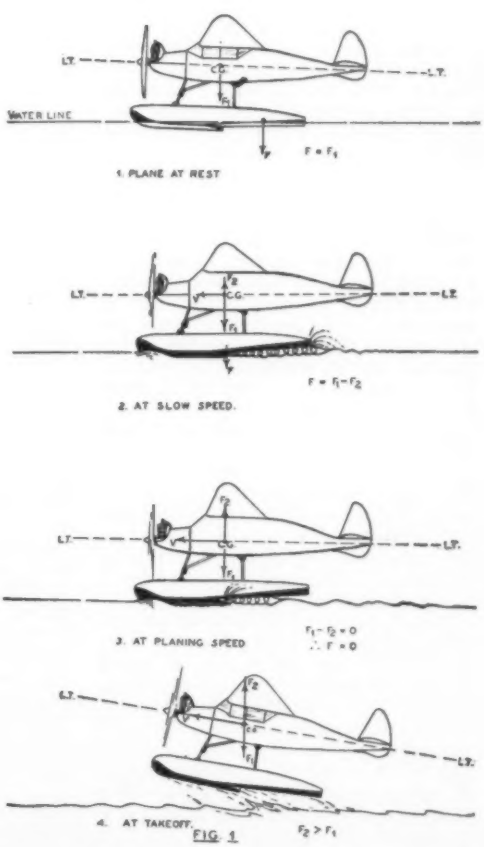
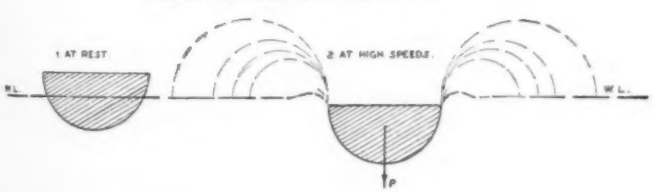


FIG. 1

FLOAT OF SEMI-CIRCULAR CROSS-SECTION



FLOAT OF CIRCULAR CROSS-SECTION.

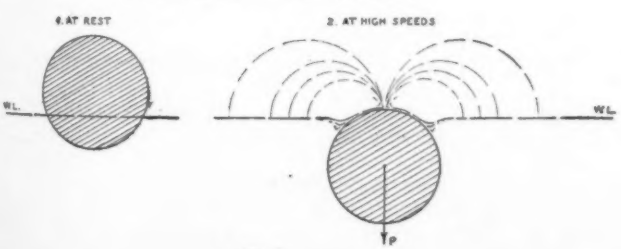


FIG. 3

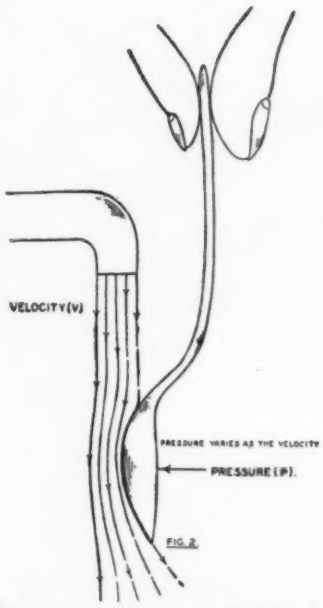


FIG. 2

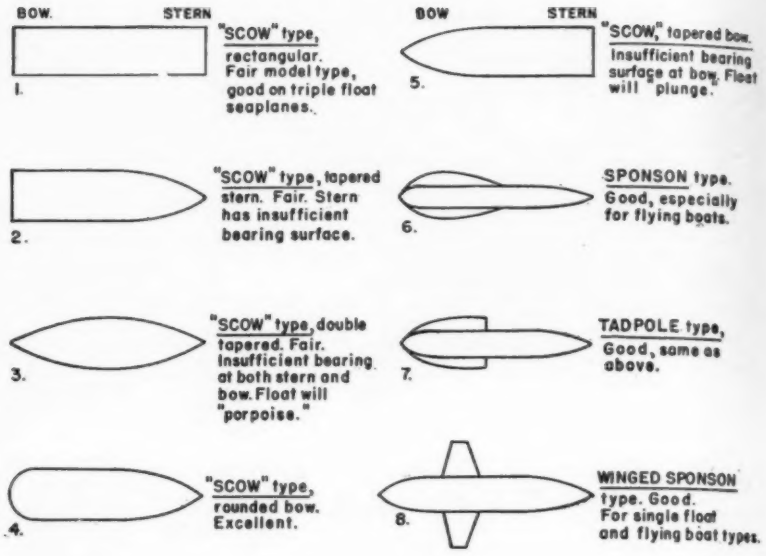
being strengthened and supplemented by this same "suction effect."

"Suction Effect" is created whenever a moving fluid passes over a convex plane—a curved surface having a positive curve, i.e.—the outer surface of a dome or a ship's hull. All aviation enthusiasts are well aware of the fact that over two-thirds of the total lift upon an airfoil in a moving stream of air is generated by the airstream passing over the upper surface of the airfoil. This pressure at high speeds is very great; powerful enough in some of our latest transports and bombers to enable them to lift over fifty tons of dead weight into the air. Imagine then, the tremendous pressures created by moving that same curved surface at high speed through water, a fluid 800 times more dense than air!

To illustrate the above theory of "suction effect," loosely hold the convex surface of an ordinary tablespoon in the moving stream of water issuing from the nozzle of a faucet. Notice that the bowl of the spoon is drawn into the moving stream of water with considerable force. As the spigot is turned and the rate-of-flow of water increases, note that the pressure forcing the bowl into the stream of water also increases. Fig. 2 graphically illustrates this interesting little experiment.

From this practical illustration of "suction effect," the designer reaches his first and most important principle of seaplane float design, i.e.—*No convex, curved planes, either vertical or horizontal, should come into contact with the water at any time.* Remember, this rule applies only to plane surfaces possessing *area*, not to edges or lines possessing only length.

The theory of "suction effect" on seaplane floats is illustrated in Fig. 3, which shows the effects of pressure at various speeds on a float of semi-circular cross-section and also on a float of circular cross-section. As can be seen, floats of circular cross-section will not only submerge at high speeds, but will throw into the air excessive amounts of spray; appearing to the eye as birds with out-stretched wings, the tips touching the water.


BOW.
STERN
1.
"SCOW" type, rectangular. Fair model type, good on triple float seaplanes.
2.
"SCOW" type, tapered stern. Fair. Stern has insufficient bearing surface.
3.
"SCOW" type, double tapered. Fair. Insufficient bearing at both stern and bow. Float will "porpoise."
4.
"SCOW" type, rounded bow. Excellent.
BOW
STERN
5.
"SCOW," tapered bow. Insufficient bearing surface at bow. Float will "plunge."
6.
SPONSON type. Good, especially for flying boats.
7.
TADPOLE type, Good, same as above.
8.
WINGED SPONSON type. Good. For single float and flying boat types.
FIG. 7

Step Action

To break the even flow of water around the contours of a float and to provide a definite "breaking point," a step is usually, but not always, built into the bottom contours of a float. The step, or, in some cases, the twin step, is used on single-float, twin-float and flying-boat designs; but it is not generally applied to short, stubby floats, to wing floats or to triple-float designs. Occasionally the step may defeat its own purpose by providing a smooth flow of water in the shape of an inverted waterfall over and around itself, thus causing a point where suction effect will act at speeds below the getaway speed. To correct this effect, which will be apparent if the length of the take-off is excessive but the take-off is good, air vents from the top of the float to the step may be constructed within the float; or the rear of the step may be approached gradually in a sweeping curve, as shown in Fig. 4. Either method introduces a stream of air behind the step spreading over the rear bottom of the float, thus agitating the adhering water surface clinging to the float, causing it to more quickly break away from the surface of the water.

If the first method is

(Continued on page 57)

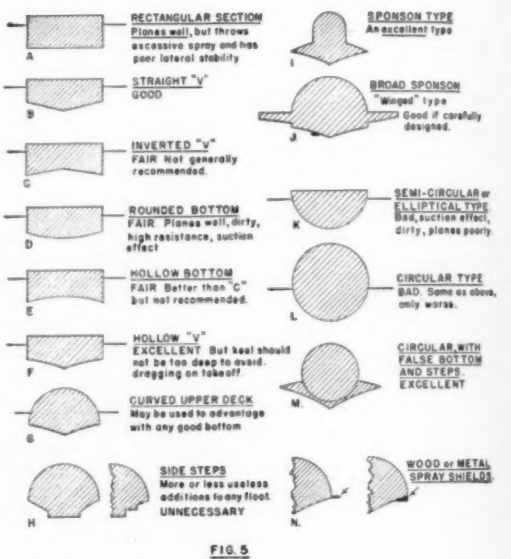
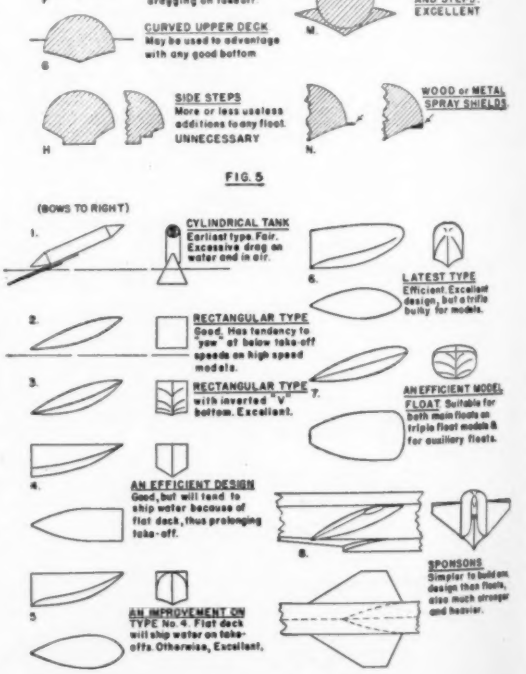


FIG. 5


(BOWS TO RIGHT)
1.
CYLINDRICAL TANK
Earliest type. Fair. Excessive drag on water and in air.
2.
RECTANGULAR TYPE
Good. Has tendency to "paw" at below take-off speeds on high speed models.
3.
RECTANGULAR TYPE
with inverted "V" bottom. Excellent.
4.
AN EFFICIENT DESIGN
Good, but will tend to ship water because of flat deck, thus prolonging take-off.
5
AN IMPROVEMENT ON TYPE No. 4. Flat deck will ship water on take-offs. Otherwise, Excellent.
6.
LATEST TYPE
Efficient. Excellent design, but a trifle bulky for models.
7.
AN EFFICIENT MODEL FLOAT Suitable for both main floats on triple float models & for auxiliary floats.
8.
SPONSONS
Simpler to build on design than floats, also much stronger and heavier.
FIG. 12

The "canard" gas model ready for flight

Fuselage diagonals have been added for strength

"Tail First" With Gas Power

Why "Canard" Gas Models Have Been Unsuccessful in the Past And How You Can Build One—Properly Designed—That Will Out-Fly Tractors

By ALFRED RUBIN

A month or two ago we promised to present a sensation, new, in the line of gas powered models.

We take great pleasure therefore in placing before you this canard-type gas powered plane, possessing unusual performance.

The secret of successful canard planes has long been known to a small number of model builders and the editor; however, it has never been applied successfully until this moment. To our knowledge, this little ship is the first canard-type gas model that has ever been built and flown with complete success. The location of the center of gravity well forward of the rear wing is the secret of its success. The wrong placement of the center of gravity in full scale canard aircraft, in the past, has been the chief cause of their failure.

NOW, when you look at the pictures of this plane a lot of you are going to say to yourselves and to your friends, "Oh, oh—just another freak gas job."

Well, don't fool yourself, there's nothing freakish about this ship! Unusual—yes—but not freakish.

To those of you who built models back in the late 20's and early 30's this plane won't seem strange. For you will remember the way those old twin pushers (outdoors) and single pushers (indoors) flew. Was there ever a better type of flying ship—or one easier to adjust and make fly? We don't think so.

You know, the idea of a canard (tail-first) is not a new one in gas model building. Many have not been very successful, but there's a definite reason for that! The designers forgot one or two simple little things. Then too, too many of you say that pushers can't be practical or real ships would be made that way.

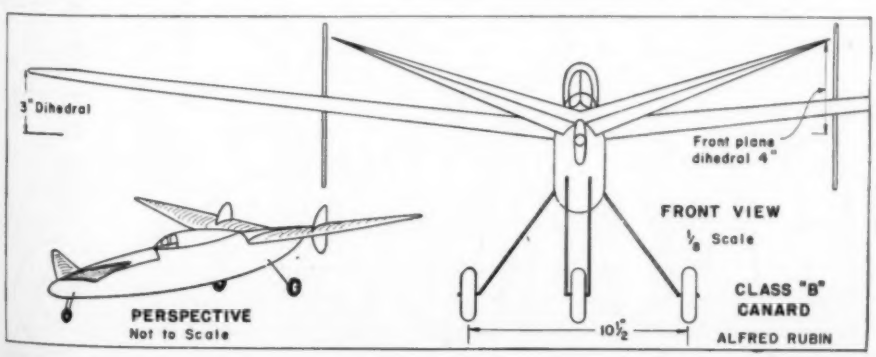
Well, you're dead wrong. It's an acknowledged fact among aeronautical engineers that the pusher is the MOST EFFICIENT TYPE OF PLANE KNOWN AND THE EASIEST TO MAKE FLY! I know what you'll say now—"then why don't they make 'em that way?" And that's easy to answer, too. It's because the Department of Commerce has decreed that no full-sized airplane shall have a lifting tail surface (though only Heaven knows why) and, in the case of a pusher, they consider the main wing as the tail surface since "it goes over the fence last" and that puts 'em OUT.

But there's no such law in model circles, and this plane will prove that you've been missing something. First of all, it's so easy to adjust that it isn't even funny. You don't have to be afraid to test hop it; it won't crack very easily. And remember, too, that if you are experienced, you're welcome to try some of your own ideas on the design.

In other words, it lends itself to experimentation. If, however, you're not confident of yourself as a designer, build it as shown and you won't be disappointed, even if you do go out of the way on the minor points once or twice—it's that flexible.

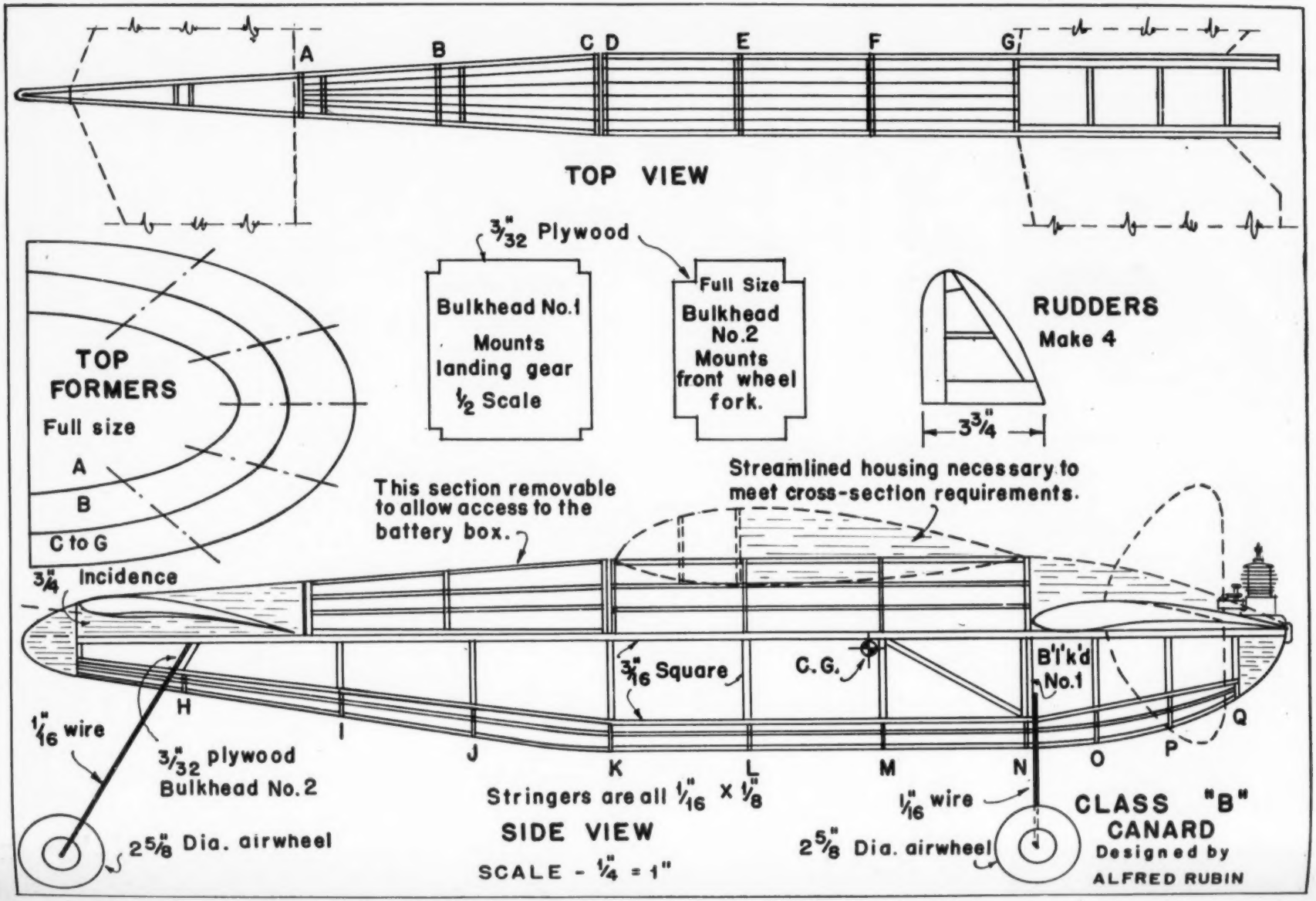
How does it fly? Swell! On its first flight, with an 18-second motor run, she did more than two minutes; on the second, with a 16-second blast, she was up for more than two minutes, and on the third, with a 20-second drag, she went out of sight, after three minutes, in the general direction of Europe, never to be seen again.

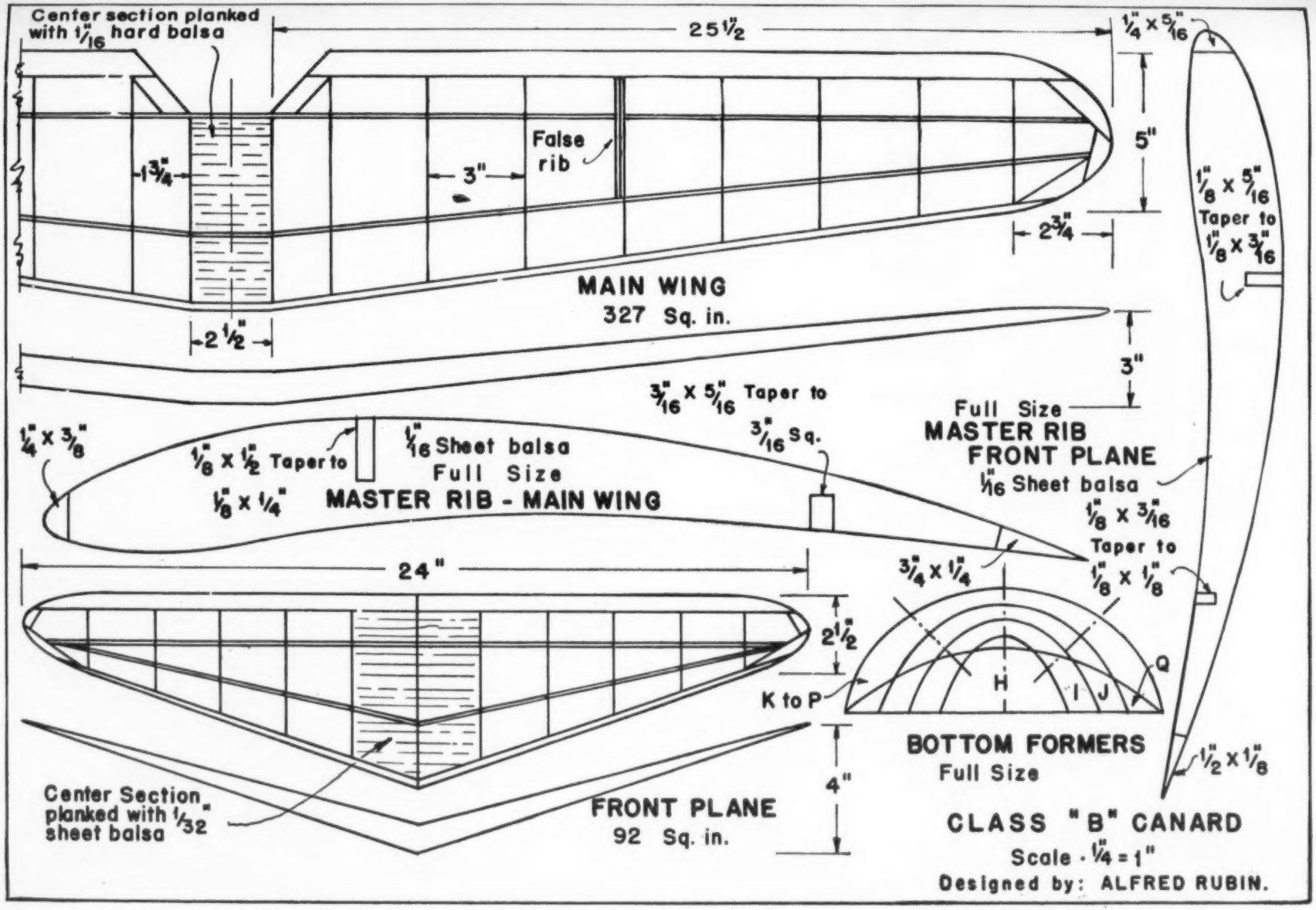
And we'll tell yo something else. We're from Atlantic City, and down here a "calm day" means about a 20-mile-an-hour wind. So you see she isn't easily affected by weather. The original was powered by an Ohlsson "23," but a Brownie will do just as well—they're both fine "put-puts"! If you wish, go ahead and decrease its size to a Class "A" job, or step it up to a Class "C"—you'll have no trouble. We never have had so much confidence in a gas job. . . . Do anything you want to it—bet you can't keep it down!



What's the secret of its success? Center of gravity, properly placed! Yep, that's the story in a nutshell. (Thanks to Mr. Chas. Grant for this information.) You see, when you flew those old twin pushers, they were loaded down with rubber motors that often weighed twice as much as the ship itself and most of that weight was concentrated well forward of the main, or rear, wing, bringing the center of gravity well forward of the main surface—WHICH IS ESSENTIAL IF THE

(Continued on page 52)


A
B
C D
E
F
G
TOP VIEW
3/32 Plywood
Bulkhead No.1
Mounts landing gear
1/2 Scale
Full Size
Bulkhead No.2
Mounts front wheel fork.
RUDDERS
Make 4
3 3/4"
TOP FORMERS
Full size
A
B
C to G
This section removable to allow access to the battery box.
Streamlined housing necessary to meet cross-section requirements.
3/4" Incidence
3/16 Square
C.G.
B'l'k'd No.1
H
I
J
K
L
M
N
O
P
Q
1/16" wire
3/32 plywood Bulkhead No.2
2 5/8" Dia. airwheel
Stringers are all 1/16 x 1/8
SIDE VIEW
SCALE - 1/4 = 1"
1/16" wire
2 5/8" Dia. airwheel
CLASS "B" CANARD
Designed by
ALFRED RUBIN


Center section planked with 1/16" hard balsa
25 1/2"
1/4" x 5/16"
5"
1 3/4"
3"
False rib
2 3/4"
1/8" x 5/16" Taper to 1/8" x 3/16"
MAIN WING
327 Sq. in.
2 1/2"
3"
3/16" x 5/16" Taper to 3/16" Sq.
Full Size
MASTER RIB FRONT PLANE
1/16" Sheet balsa
1/4" x 3/8"
1/8" x 1/2" Taper to 1/8" x 1/4"
1/16" Sheet balsa
Full Size
MASTER RIB - MAIN WING
1/8" x 3/16" Taper to 1/8" x 1/8"
3/4" x 1/4"
24"
2 1/2"
K to P
H
I
J
Q
BOTTOM FORMERS
Full Size
1/2" x 1/8"
Center Section planked with 1/32" sheet balsa
4"
FRONT PLANE
92 Sq. in.
CLASS "B" CANARD
Scale - 1/4 = 1"
Designed by: ALFRED RUBIN.

Pict. No. 1. Albert Becker Jr. glide tests his plane —Looks good, Eh!

Pict. No. 2. Charles Siegfried flew this beautiful 14 foot "radio" plane, winning 2nd place

WINGS of

IF YOU were asked what phase of the Nationals interested you the most, what would be your answer? Is it meeting old friends, making new acquaintances, the joy of being out of doors, the thrill of flying ships in competition that interests you most—or all the new designs of planes and gadgets and acquiring new ideas for future models?

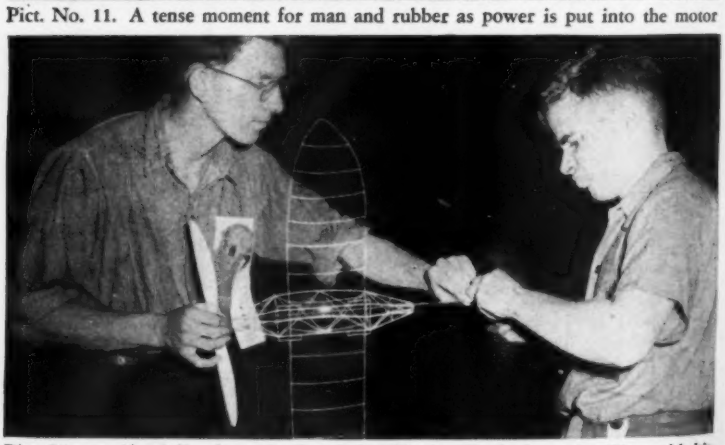
Apparently the latter holds the greatest fascination for the majority of model builders. At the 1940 Nationals there was a host of new designs and ideas and, without doubt, the new gas model rules were responsible for many of them. Under them model builders are allowed greater scope of design than formerly, and unlike other Nationals there was a great variety of design;

Pict. No. 5. Bill Hammer with a Rearwin "scale"

Pict. No. 6. Jack Thames and his Moffett job

Pict. No. 11. A tense moment for man and rubber as power is put into the motor

Pict. No. 7. Ervin Leshner gives 'er a boost



Pict. No. 8. Abe Adler from the East helps Charles Werle from the West with his "indoor"

Pict. No. 3. (Bill-Walter?) Good starts his "good" radio job on its winning flight

Pict. No. 4. Dean Berry made fine flights with this

the NATIONALS

no one particular type predominating or being present to the exclusion of others. However the majority of the ships was of the parasol type, of which the old KG was the prototype. No one particular type of model appeared to have a monopoly upon record-breaking flights; places were won by all types of ships.

This was probably due to a point which was overlooked by many builders; namely, any particular type of ship requires a special handling technique. For instance, in picture No. 1 you see Albert Becker Jr. glide-testing his high-wing gas model. Here the thrust line is high, the body bulges down making the position of the side area or center of lateral area quite low. Such a ship will fly well in all flight positions, in horizontal flight or when climbing. In order to give it the side roll required for a spiral climb, the ship must be adjusted in a particular manner; either it must be given a slight left rudder or possibly the builder may depend upon the torque to create the banking tendence required for such a type of climb.

In this type of ship maneuvers are created by the adjustment of the plane; the design itself being best adapted to straight or gentle circling flight when all surfaces are

Pict. No. 12. John Chizmodia flew his fine Rearwin scale job

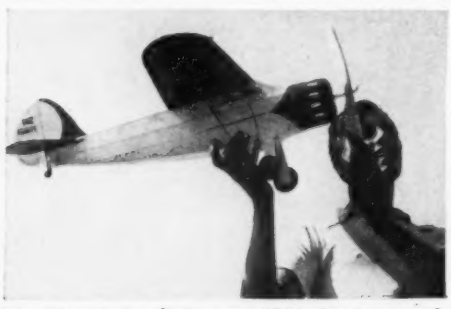
Pict. No. 13. John Tudor's Cahill model grew a long neck

Pict. No. 9. No, it's not Joe E. Brown

Pict. No. 10. Philip Sonheim and his radio plane which unfortunately spun in

Pict. No. 14. Bob Hoffman and his Moffett job

Pict. No. 15. Max Wassem with his high-aspect ratio Moffett plane. It had great soaring ability



Pict. No. 16. Leo Bailey, an old Nationals contender, flew this beautiful scale Cessna.

Pict. No. 17. Chester Stasik and his Feisler Storch, the most interesting fly scale plane at the contest

set neutrally.

There is nothing in the design to create a special type of maneuver, such as is found in ships of the parasol type with the C.L.A. high. This type of ship is usually unstable when flying horizontally. However the effect which creates instability, when flying in this manner, gives this ship the required roll and resultant spiral when the ship is climbing at a steep angle. When this particular type of ship is flown it must be adjusted and maneuvered in a particular manner. Primarily it is designed for steep climbing and under these conditions it will fly stably. Though having a tendency to spiral dive in horizontal flight, this obviously is impossible when the ship is nosed upward and climbing at a high rate of speed. The bank and roll which normally, in horizontal flight, causes a spiral dive produces the desired effect, when climbing, of the spiral climb. Thus a particular design feature is used to obtain a desired maneuver. At the top of the climb the engine dies then, without power, the low center of gravity and the high wing become effective to make the ship extremely stable in the glide.

A visitor to the Nationals can spend all of his time passing from one ship to another and examining various interesting features. The radio control models held the attention of fans more this year than any other; in fact there was a greater number on hand than ever before, with many new developments in this fast-moving phase of modeling. Picture No. 2 shows Charles Siegfried's immense radio job. It had a wing spread of about 14 feet and put up a very fine performance, to take second place.

Pict. No. 20. Bill Brown and his Pietenpol

Picture No. 3 shows you a dramatic moment: The take-off of the Good's radio plane. This ship placed first for the third consecutive year. Apparently the Good brothers, Walt and Bill, have mastered the art of preparing and handling their ship. Building it and having all mechanical details correct is very important; however most of the radio competitors failed to make good flights with their ships because of improper handling technique. A number of ships crashed because the builders became confused, or there was a lag in the response to the controls.

The Good brothers are two of those very calm, scientific individuals who are not influenced easily by the emotional aspects of the situation. Every necessary step in preparing and flying a plane was carried out with decision and this, unquestionably, is the secret of their success.

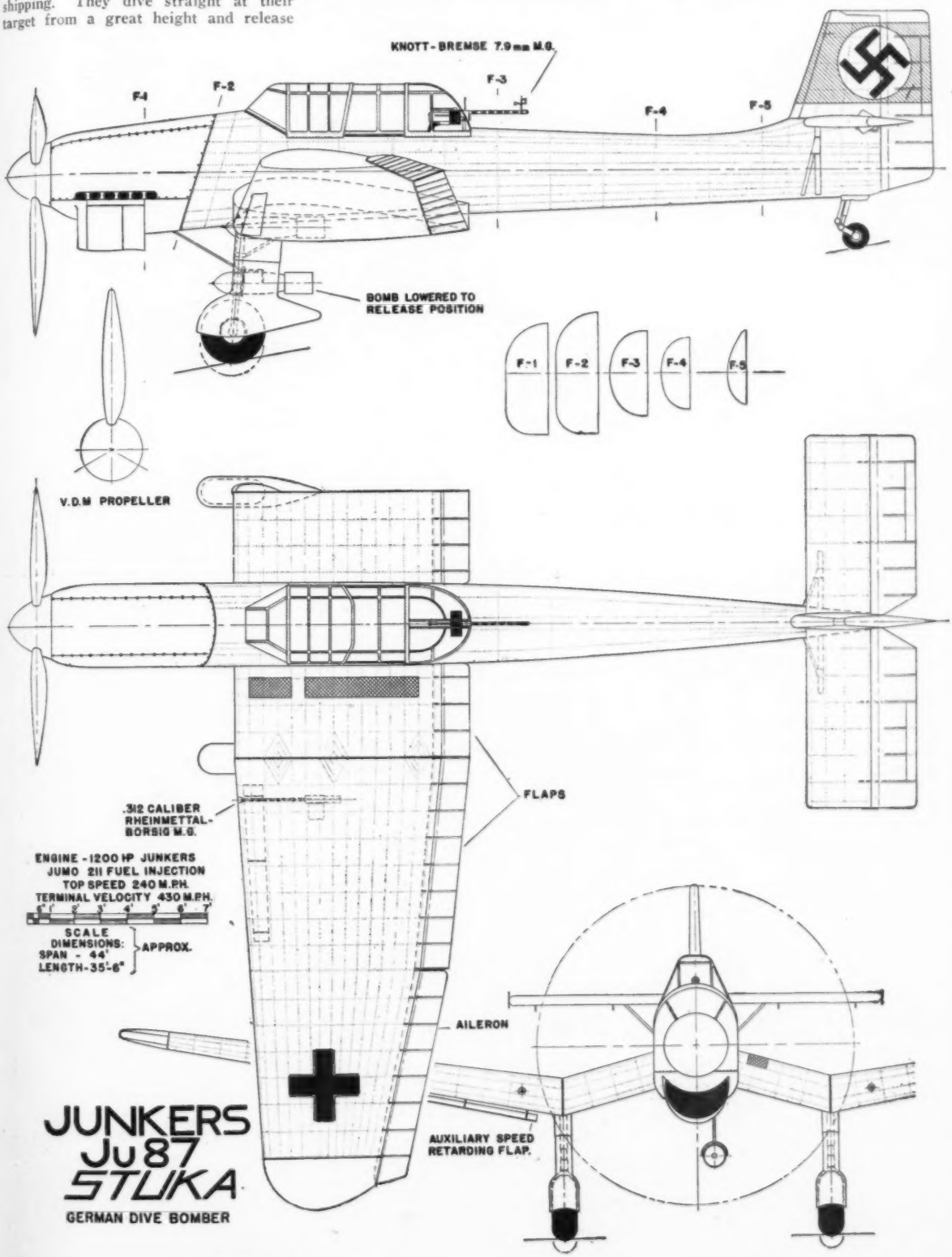
(Continued on page 50)

Pict. No. 19. Carroll Krupp and his model which has a folding tail that makes winding easy

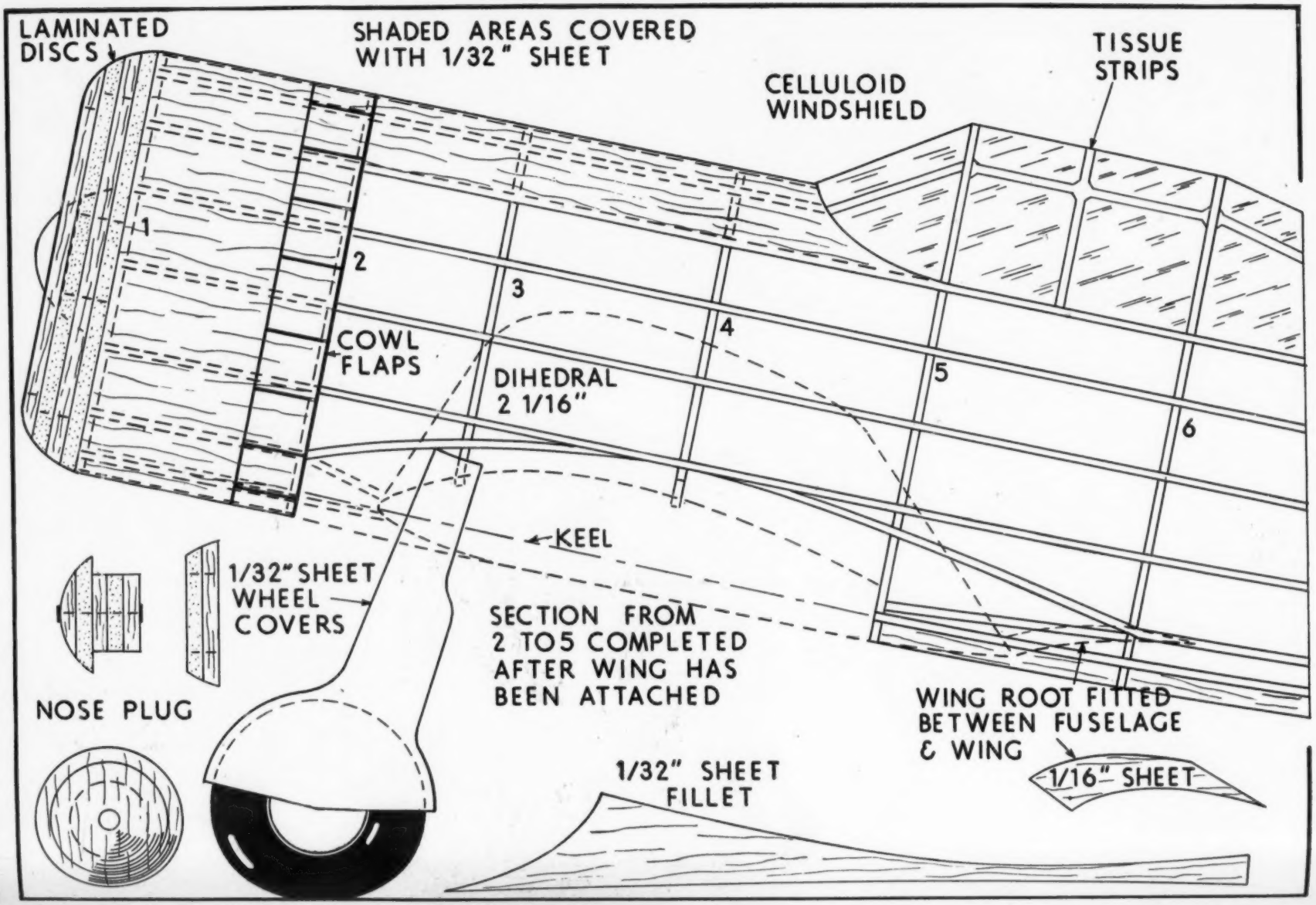
Pict. No. 18. Elmer Wassman brings back what is left of his radio plane after it crashed

The Junkers 87—Dive Bomber

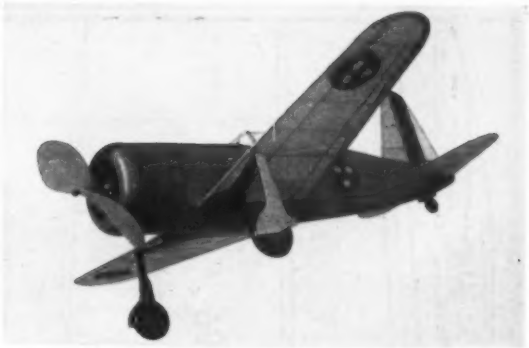
This is the famous deadly plane the Germans are using to destroy British shipping. They dive straight at their target from a great height and release their bombs close to their objective, then swoop upward suddenly and speed away—provided they are not blasted by anti-aircraft fire.



DRAWN BY J.B. RUST


LAMINATED DISCS
SHADED AREAS COVERED WITH 1/32" SHEET
CELLULOID WINDSHIELD
TISSUE STRIPS
1
2
3
4
5
6
COWL FLAPS
DIHEDRAL 2 1/16"
KEEL
1/32" SHEET WHEEL COVERS
NOSE PLUG
SECTION FROM 2 TO 5 COMPLETED AFTER WING HAS BEEN ATTACHED
WING ROOT FITTED BETWEEN FUSELAGE & WING
1/16" SHEET
1/32" SHEET FILLET

The completed model, realistic in detail



The wide tread helps take-offs and landings

The Vultee Vanguard Flying Miniature

How to Build a High Performance Flying Scale Model of Uncle Sam's Latest Fighter

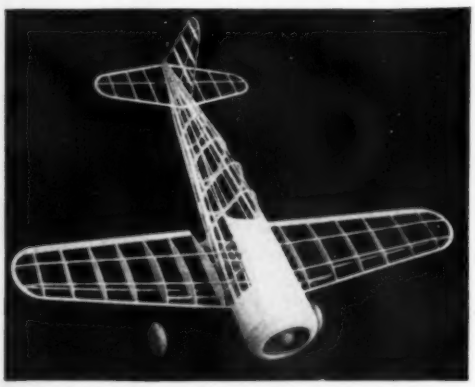
By EARL STAHL

OF ALL the ultra-modern pursuit ships none is more formidable and flexible than the new Vultee Vanguard. So good did this plane look to Sweden that she has adopted it as standard pursuit equipment and placed an order for 144 at a cost of $9,000,000.

Despite the fact that it is one of the fastest planes of the day, its most outstanding feature is that it is the world's most heavily armed pursuit ship. The famous British Spitfire and the German Messerschmitt each carry 8 machine guns, but the Vanguard mounts 10, plus 10 small bombs for breaking up formations of bombers. It can be stripped down for servicing in two minutes flat and gun barrels can be changed without removing the gun itself. By reducing the number of machine guns, cannons firing explosive shells can be mounted, making it more effective against armor-protected planes.

When powered by a double-row Pratt and Whitney Wasp engine this single seater has a maximum speed of 358 m.p.h. Its cruising speed is 316 m.p.h., and it lands at 73. The fuel load of 240 gallons is sufficient to keep the plane in action about 2 1/2 hours.

Here's the little plane climbing skyward. It's attitude denotes stability and grace



The structure is simple but strong

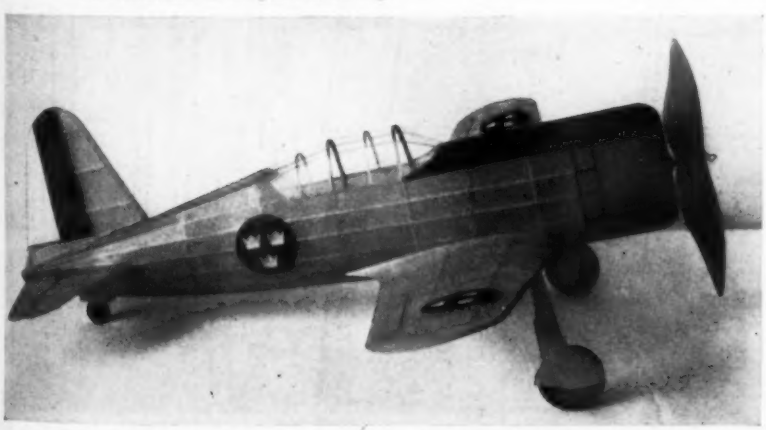
The model has been accurately reproduced and is worthy of any effort expended on its construction. It is not only attractive as a display model but it is also a speedy, stable flyer. A small amount of wing area and the large fuselage naturally limit the model's capacity for making flights of long endurance; however, it will afford real satisfaction with the many realistic flights it is sure to make.

Fuselage

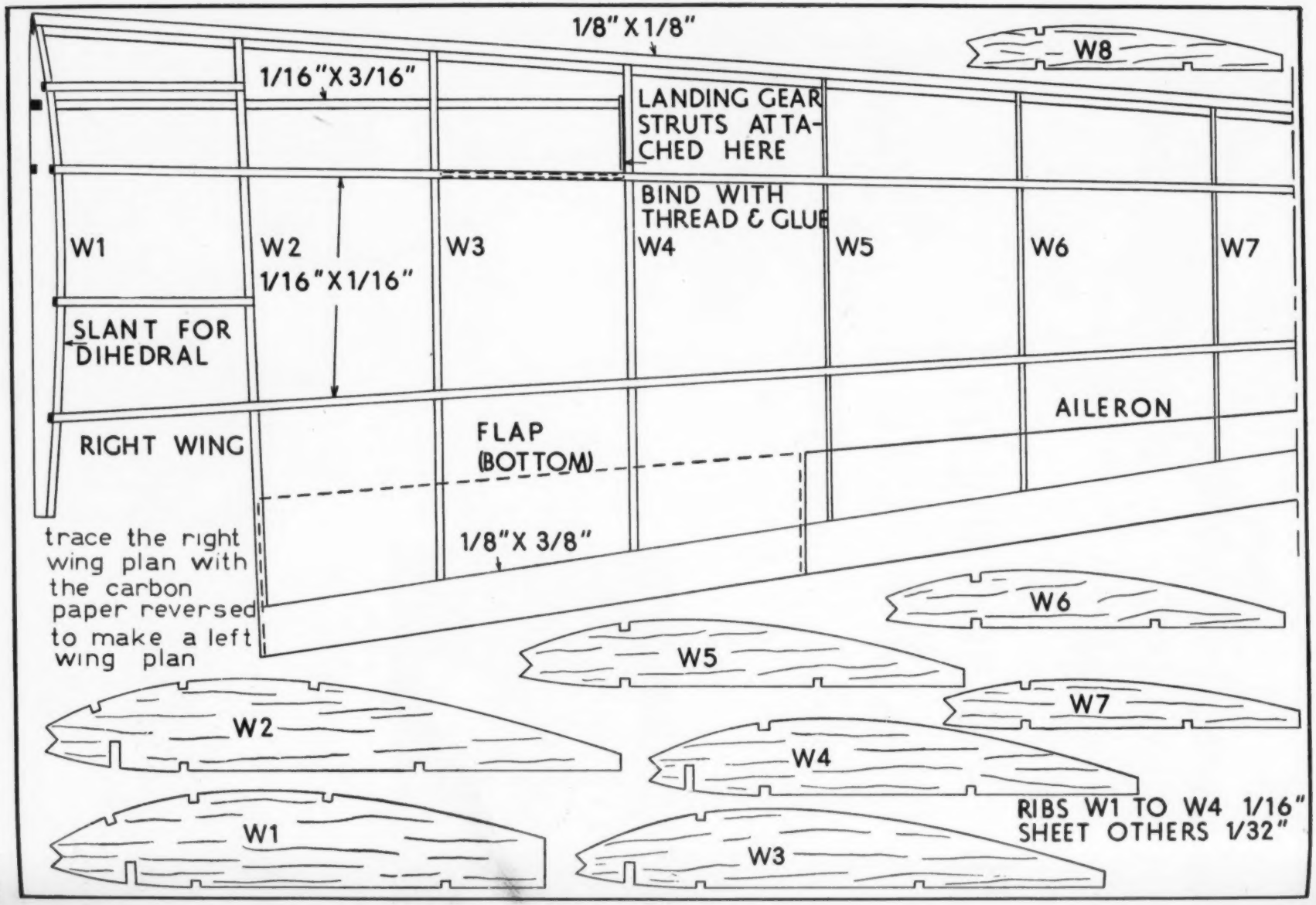
Begin the construction by making the keel pieces. Trace the top and bottom outlines of the side view to get the correct shape; the bottom keel is a continuous piece extending from nose to tail and the top keel is two separate pieces. Average depth of the keels is about 3/16"; they are cut from 1/16" sheet balsa. Bulkheads are shown full size on the plan and they, too, are cut from medium grade 1/16" balsa sheet. Two of each are required. It will be noticed that only a few of the bulkheads have notches for all of the stringers. Cut out the notches shown and mark the positions of the others which will be cut later.

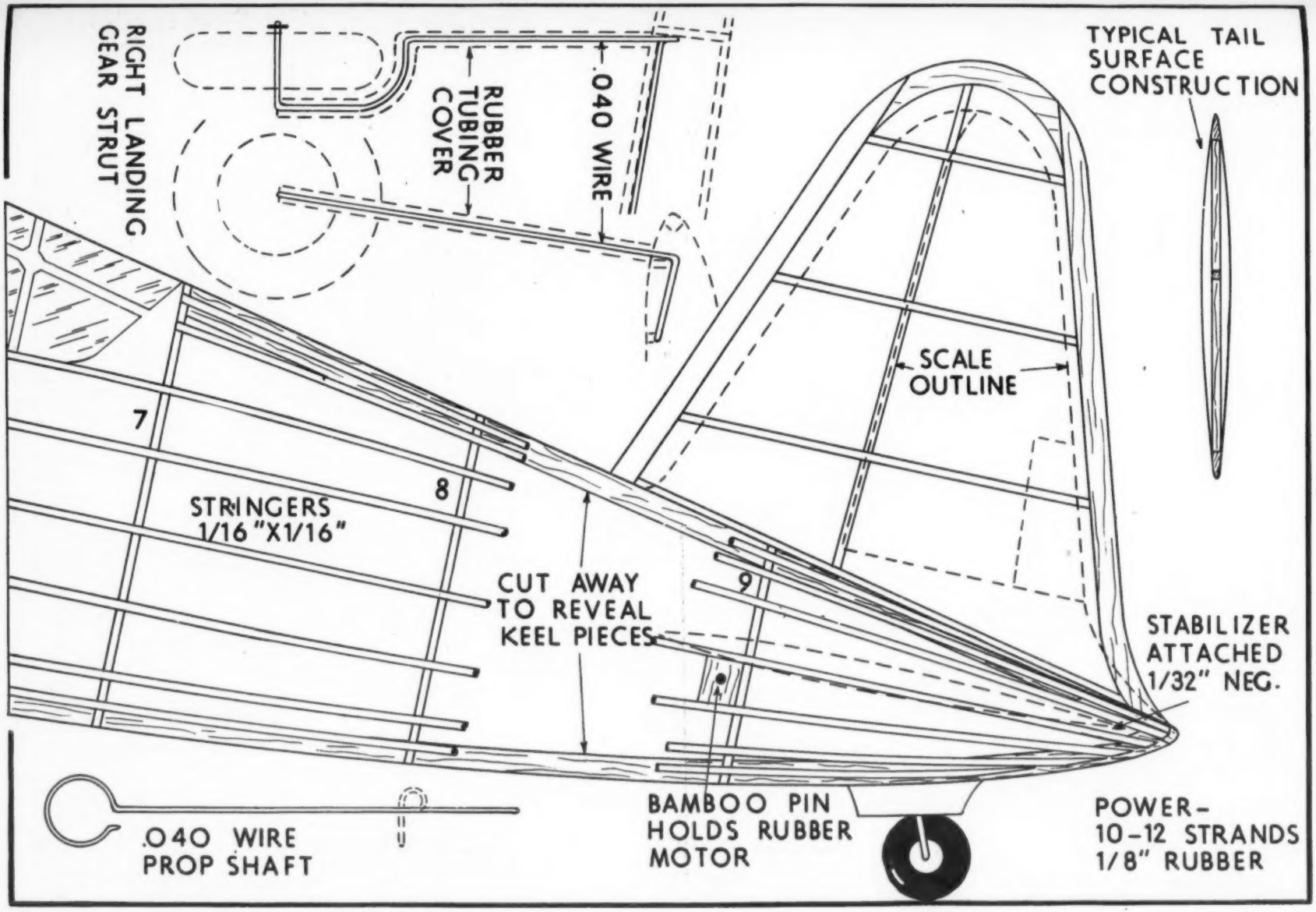
Pin the keel pieces into position over the plan and begin actual assembly of the fuselage. Temporarily cement a piece of 1/16" x 3/16" balsa between the top keels to join them at the opening created by the

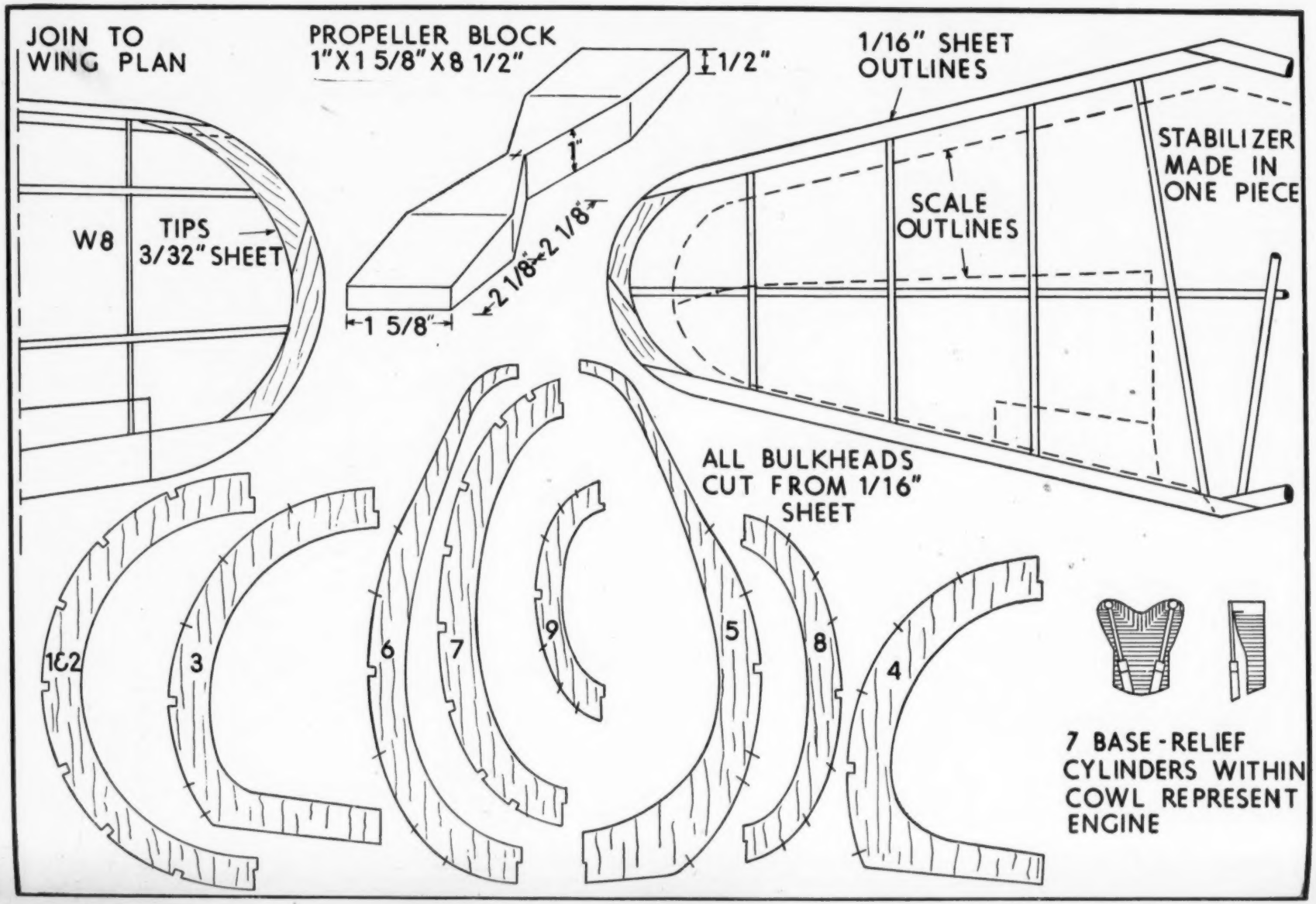
(Continued on page 54)



The large, high-pitch prop gives fine performance to this beautiful ship


1/8" X 1/8"
W8
1/16" X 3/16"
LANDING GEAR STRUTS ATTACHED HERE
BIND WITH THREAD & GLUE
W1
W2
W3
W4
W5
W6
W7
1/16" X 1/16"
SLANT FOR DIHEDRAL
AILERON
RIGHT WING
FLAP (BOTTOM)
1/8" X 3/8"
trace the right wing plan with the carbon paper reversed to make a left wing plan
W6
W5
W7
W2
W4
RIBS W1 TO W4 1/16" SHEET OTHERS 1/32"
W1
W3


RIGHT LANDING GEAR STRUT
RUBBER TUBING COVER
.040 WIRE
TYPICAL TAIL SURFACE CONSTRUCTION
SCALE OUTLINE
7
8
9
STRINGERS 1/16"X1/16"
CUT AWAY TO REVEAL KEEL PIECES
STABILIZER ATTACHED 1/32" NEG.
.040 WIRE PROP SHAFT
BAMBOO PIN HOLDS RUBBER MOTOR
POWER- 10-12 STRANDS 1/8" RUBBER


JOIN TO WING PLAN
PROPELLER BLOCK 1"X1 5/8"X8 1/2"
1/2"
1"
2 1/8"
2 1/8"
1 5/8"
1/16" SHEET OUTLINES
STABILIZER MADE IN ONE PIECE
SCALE OUTLINES
W8
TIPS 3/32" SHEET
ALL BULKHEADS CUT FROM 1/16" SHEET
1&2
3
6
7
9
5
8
4
7 BASE-RELIEF CYLINDERS WITHIN COWL REPRESENT ENGINE

Pict. 1. Charles Hamilton displays a unique underslung one-wheeler

GAS LINES

AIR WAYS

NEWS OF MODELS AND BUILDERS FROM ALL PARTS OF THE WORLD

The All-Eastern Gas Model Contest. Second Annual Seaplane Meet. 8th Annual G.M.A.A.S.C. Championships

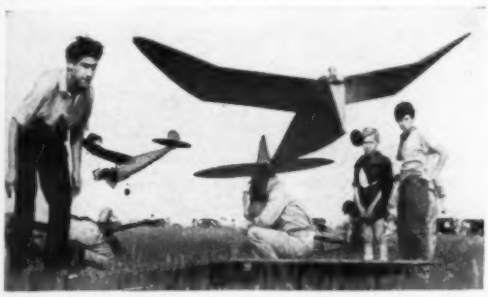
ALTHOUGH 1,400 model builders attended the Nationals, there were thousands of them who remained at home to fly in regional contests. Of course, the national contest is the most important one of the year, nevertheless other contests were important to those who could not attend at Chicago.

Many of these took place before the Nationals, serving, to a certain extent, as elimination contests and as a means to test out new designs created during the winter months. For this reason many of these were even more interesting than the national affair, taken from the standpoint of models of new and unusual design.

The most important contest in the East, and one which is sometimes called the "Little Nationals," was the All Eastern States Model Airplane contest, organized and sponsored by the Kresge Department Store of Newark, N.J., and MODEL AIRPLANE NEWS. This meet has become an institution, having been held regularly for a number of years. It was directed by Messrs. Ben Shereshaw, Leon Shulman and Charles Grant. Most of the organization and management fell upon the shoulders of Mr. Charles Hart of Kresge's.

One of the features of the meet, at least to the winners, was the imposing array of trophies which was given away. The list of them appears in the latter part of the article together with their winners. The sponsors rendered a real service, not only in the fact that a great deal of effort and money was spent in putting on this contest, but at the time chosen, June 15th, it provided builders with the chance to test new models and prepare thoroughly for the Nationals in July.

The physical aspects of the meet were very complete. A large tent served as headquarters. Here the trophies and other prizes were on display and meet officials carried on the considerable detail entailed in operating the contest. All flight



Pict. 2. Leon Shulman's "Flying Cleaver" takes off

Pict. 3. Geo. Gilchrist watches with hope in his eyes

Pict. 4. Louis Garami and his new Class A job

Pict. 5. Frank Ehling came with this "twin motor"

Pict. 6. The crowded Field Headquarters nearly collapsed during the storm

Pict. 7. Russell Simmons watches his plane take off on its winning flight

Pict. 8. The winning ship with folding prop

Pict. 9. John Zeidwitz launches his soarer gas model that was lost

Pict. 10. Kenneth Hjlen knows how to launch them—no push

Pict. 11. Joe Mastrovitch "cleaned up" with his "square enders"

Pict. 12. Carroll Moon describes the thrills over the loud speaker

Pict. 13. Armand Vanquez and his beautifull gull-wing, one-wheeler gliding in

Pict. 14. The happy group of contest winners with their trophies. Standing L-R: Ed Miller, Burroughs, Cliff Simmons, Russ Simmons, Stan Jaskot, Jos. Mastrovitch, Frank Lashek, Ed Osterling, Fred Gross. Seated: Mile LaTorre, Fred Ungrich, Charles Grant, George Neil, Vincent Bohemme, Jim Ulmes

Pict. 15. Roger Smith and his ship go "hydro"

Pict. 16. Frank Lashek's Fairchild Amphibian

times were turned in at the recorder's desk where they were classified. The weighing and measuring tables also occupied one part of the enclosure, which was conveniently open at one side.

One improvement made over previous contests was the use of wider run-ways. These were all wood, built in two sections which folded together. They were placed flat on the ground with the take-off end raised slightly in order to allow models to clear the course and not drop before they were thoroughly started on their flight.

The day was bright and sunshiny, however few thermals were present. Soldiers from Raratan Arsenal acted, as in previous years, as timers. Flights started in earnest about 10 a.m. and continued until interrupted by a severe thunderstorm at 2 p.m. After an hour's delay the field dried sufficiently to resume flying. About 200 contestants were present and put on a great display of all sorts of flying, good and bad.

The outstanding flight of the day was not official as the engine ran a half-second over-time. It was made by John Zeidwitz's ship, which may be seen taking off in picture No. 9. Its excellent flying qualities were due to the broad wing span and high aspect ratio. It did not climb as high as many of the ships, but when it got up it stayed there until it disappeared in the distance, about five miles away. Unfortunately the plane was lost for a considerable time.

One of the most consistent series of flights that was ever staged in any con-

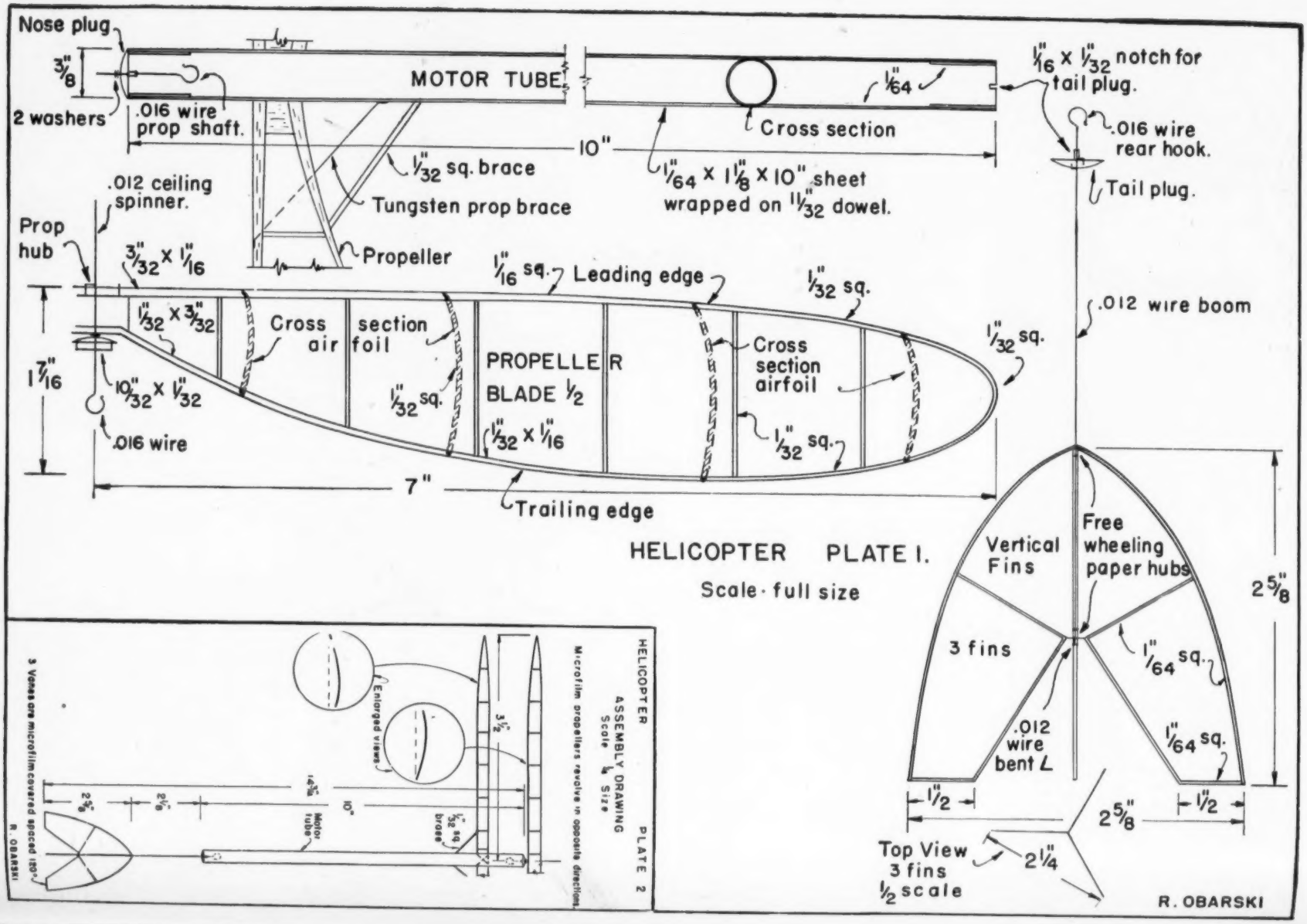
(Continued on page 46)

Pict. 18. ssss-zzzzum! "The Powerhouse" goes up

Pict. 17. Presto! Now you see Garami's Class A job with floats

Pict. 19. A hydro leaves the water for time aloft, but—

Pict. 20. It suddenly decides to go fishing


Nose plug
3/8"
2 washers
.016 wire prop shaft.
MOTOR TUBE
10"
1/64
Cross section
1/16" x 1/32" notch for tail plug.
.016 wire rear hook.
Tail plug.
1/32" sq. brace
Tungsten prop brace
1/64" x 1 1/8" x 10" sheet wrapped on 1 1/32" dowel.
.012 ceiling spinner.
Prop hub
3/32" x 1/16"
Propeller
1/16" sq.
Leading edge
1/32" sq.
.012 wire boom
1/32" x 3/32"
Cross section airfoil
PROPELLER BLADE 1/2
1 7/16"
10/32" x 1/32"
.016 wire
1/32" sq.
1/32" x 1/16"
1/32" sq.
1/32" sq.
7"
Trailing edge
HELICOPTER PLATE I.
Scale · full size
Vertical Fins
Free wheeling paper hubs
2 5/8"
3 fins
1/64" sq.
.012 wire bent L
1/64" sq.
1/2"
2 5/8"
1/2"
Top View 3 fins 1/2 scale
2 1/4
R. OBARSKI
HELICOPTER ASSEMBLY DRAWING PLATE 2
Scale 1/4 Size
Microfilm propellers revolve in opposite directions.
3 Vanes are microfilm covered spaced 120°
R. OBARSKI
Enlarged views
3 1/2"
14 3/8"
10"
2 5/8"
2 1/8"
Motor tube
1/32 sq. brace

A RECORD BREAKING HELICOPTER

A Brief History of the Development of the Indoor Model Helicopter and How You Can Build One Which Holds the N.A.A. Senior Record

By RICHARD OBARSKI

The N.A.A. senior record helicopter. Its construction is delicate but it is simple to build

FOLLOWING their successful trial schedule for the past few years, the Chicago Aeronuts have been building helicopters of every size and design. In the first practice session all balsa or tissue helicopters were used and as a result high time was less than a minute. However concentrated effort by the club members soon raised the time, and an N.A.A. sanctioned contest was held.

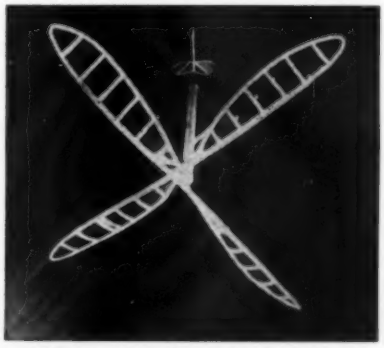
The scene of the first important helicopter contest in the model world was a park gymnasium with a twenty foot ceiling. Twelve helicopters were entered in the three divisions: six seniors, four juniors and two open. Eight microfilm jobs were present, indicating the owners realized that to get a record their ships had to be very light. High time for the day was "hung up" by Carl Goldberg with the excellent flight of two minutes, forty-seven seconds. His ship had a pair of three-bladed propellers spaced about two inches apart, an inclosed motor and a stationary vertical fin (it revolved with the tube and did not have the later adopted free-wheeling device.) Carl's model was beautifully constructed and very light. The junior record established by Alex Nekimken was about two minutes. The senior record by Dennis Turner was one minute, forty-seven seconds. Our best time in that contest was one minute, thirty-three seconds.

Gathering together what we thought were the best points in each of the winning models, we designed the present helicopter as a contest ship. Not being content to wait two days to get into the armory, we flew it in the living room of our home, and got the very encouraging time of two minutes, fifty-eight seconds with a nine-foot ceiling. The only adjustments necessary were the addition of tungsten bracing to keep the tube propeller from flaring too much and hitting the top propeller and the straightening of the vertical fin boom.

The Saturday of the record trials dawned clear and warm and at 11:00 A.M. we were in the spacious 132nd armory unpacking the model under a 90 foot ceiling. The first official flight was made on about 75% power because the official record in the senior class was only one minute, forty-seven seconds and I hoped my helicopter would break it on 3/4 power, without the danger of breaking and preventing any further flights.

The opposite-turning microfilm propellers rotated at a moderate rate of speed as the machine slowly climbed to the roof in seventy seconds, spun about on its ceiling-spinner (which consisted of a short piece of wire protruding from the hub of the top propeller) and steadily descended to turn in the time of two minutes and eighteen seconds. the model landed with about 40% of the winds remaining. More power was expended because the propellers were already flaring to their limit, so we decided to decrease the pitch of the propellers. The effect of this decision was immediately apparent as the model dead-sticked on the next flight, a short test-hop.

On the second official flight, with about 90% power, the model climbed to the ceiling in forty-five seconds and hit the roof with such force we thought it was going to drill through. After watching the model spin about on the ceiling for about two minutes it was evident that a good flight was being made, so we cleared the floor to get the best possible duration out of the model. It slowly descended after the excellent time of four minutes, thirty-five seconds, until it touched the floor. On the third official flight, with full power, the propeller flared so much that it broke off and wrecked the model, thus preventing the full third official flight and raising the time to more than five minutes.



This top view shows the disposition and construction of the rotor blades

General Specifications

Two microfilm propellers made on block 1-1/4" x 7/16" x 14" shaped as indicated. One right-hand and one left-hand.

Power—20"—5/64" brown rubber.

Three fins (two shown) equally spaced with free wheeling.

All surfaces microfilm covered.

Motor tube 1/64" x 1-1/8" x 10".

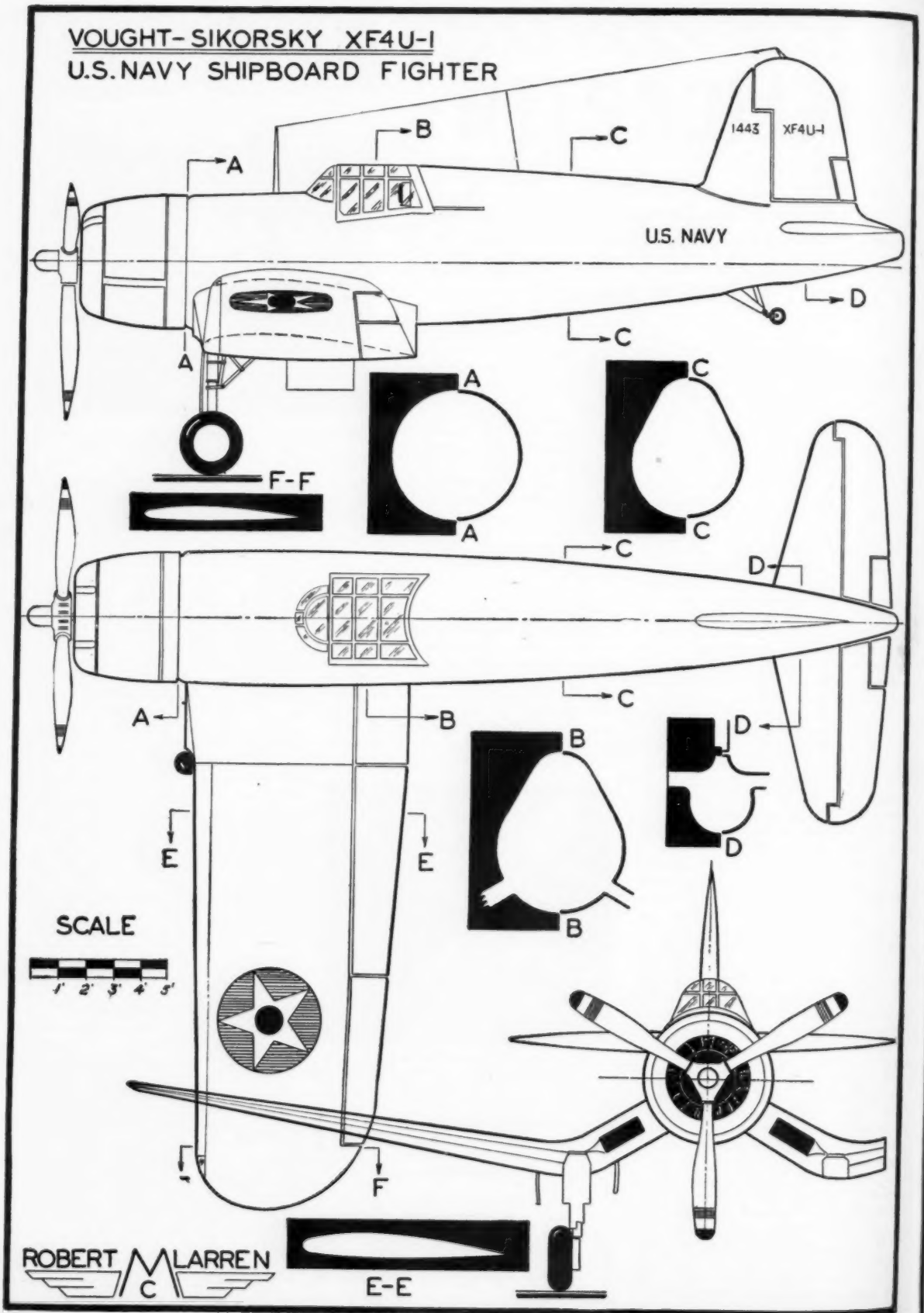
Medium hard balsa on props, light otherwise.

A few weeks later we had the opportunity to take the model to St. Louis and fly it in a 135 ft. ceiling, but had neglected to repair it. We believe the record could have been raised at least 1 1/2 minutes to make a flight of six minutes.

It is indeed interesting to experiment with a type that has not received much consideration from the average model builder, and there is no doubt in our minds that if experimented with, the helicopter record of a year hence will be still higher.

This helicopter possesses a number of essential advantages for long flights, which are: (1) Very light in weight except for the propellers which take a great deal of abuse and strain. (2) A free-wheeling vertical fin that takes no energy from the motor and gives a maximum amount of stability, without which the helicopter would travel in any direction but vertically. (3) A wire ceiling-spinner on the upper propeller to maintain stability when the ship reaches its limited altitude and to prevent the propellers locking or tearing themselves to pieces by hitting each other. (4) The propellers are only an inch apart which is necessary for greater stability and longer duration. (There seems to be an oscillating motion when the propellers are placed farther apart.) (5) The internal motor decreases drag tremendously and produces a much smoother flight. (6) Vertical fins that are a necessary constituent of stability on the helicopter. (Helicopters have been built without vertical fins and their duration was very disappointing due to horizontal instead of vertical flight.) (7) Very low pitched propellers to keep sufficient thrust throughout the flight. Experiments have proven that low pitched props work best on helicopters. Three-bladed props might be experimented with, but we doubt if they would have any advantage over the two-bladed ones. Double-covered microfilm props might be employed to give a more efficient power output and a smoother flight.

(Continued on page 66)


VOUGHT-SIKORSKY XF4U-1
U.S. NAVY SHIPBOARD FIGHTER
1443
XF4U-1
U.S. NAVY
A
B
C
D
E
F
F-F
E-E
SCALE
1' 2' 3' 4' 5'
ROBERT C LARREN

A Fighter Afloat

THE PLANE ON THE COVER

BY ROBERT McLARREN

The Vought Sikorsky "Carrier" fighter

THE consideration and solution of special problems has been the keynote of American engineering. No other nation has advanced to the highly specialized and detailed technical development point that has the United States. And in the aeronautical engineering field, the shipboard or carrier fighting plane has moved into a category unique in world Naval aviation; it occupies its own particular position in the tactical, design and construction field.

Other air forces the world around utilize planes of a very generalized design nature for this work. England's Gloster Gladiator and Blackburn Roc, Germany's Arado Ar. 95 and Henschel Hs. 123, and Italy's Ro. 41 and Fiat G. 50 are all standard land-planes adapted as best possible for carrier work.

But in the United States Navy only planes which have been designed from the keel up for the specific job of flying and fighting from carrier decks are now alighting in mid-ocean on these sea-going eagle's nests. Newest and most advanced result of thirteen years' intensive effort in this field is our Plane on the Cover this month: The Vought-Sikorsky XF4U-1 single-seat Shipboard Fighter.

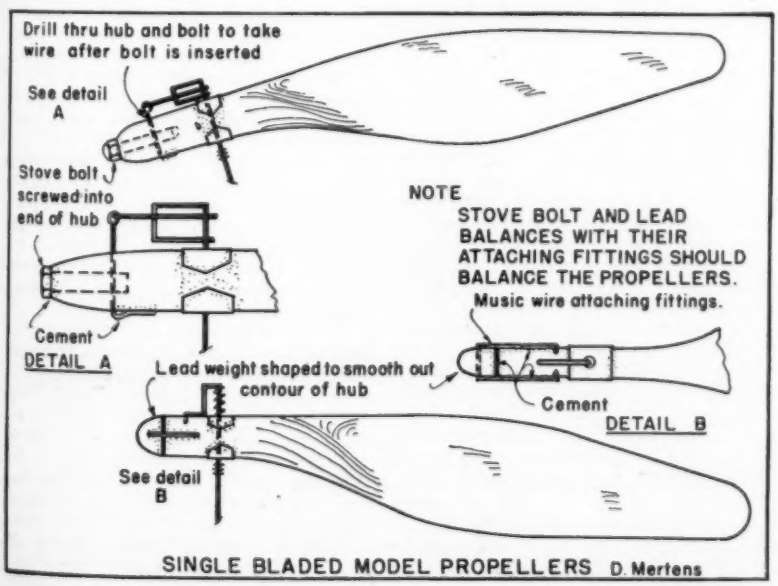
It is interesting to trace the many lines of development which converge simultaneously into the design of a new fighting plane. Actually the geneology of any plane flying today goes back to ancient times when man first envisioned actual flight through the air. But for the actual blood relatives of an airplane, this is sometimes easily traced. Actually, this new fighter was born in the mind of Jack Northrop in the late summer of 1935 when his famed XP-948 single-seat Army plane was designed, constructed, then disappeared on its initial test flight with Lieutenant Arthur Skaer at the controls. Three years later the entire design, rights and drawings were purchased from the Northrop concern by the, then, Chance Vought Aircraft division of United Aircraft. Later, the huge aviation corporation was re-aligned financially and the new Vought-Sikorsky firm was formed. The actual production model of the Northrop

(Continued on page 40)

A Single Blade Free-wheeling Prop

BY DONALD MERTENS

IT IS comparatively recent that the single blade propeller has been used on full sized aircraft. However, a large number of model builders have known of the advantages of this type of prop for quite some time. Many of them have discovered its advantages by accident. At least this is the way the author discovered that it was very efficient and superior to the two bladed type. Once when flying a plane, it crashed and broke off one blade of the propeller. The break occurred near the hub; the plane being undamaged and a few turns being left in the motor, it was again launched merely to see what the effect of the one bladed propeller would be upon the performance of the ship. It created a great surprise when the model climbed much better than before the break took place. There was of course a terrific amount of vibration which at the time was thought could not be overcome, so nothing was done about it.


Drill thru hub and bolt to take wire after bolt is inserted
See detail A
Stove bolt screwed into end of hub
Cement
DETAIL A
NOTE
STOVE BOLT AND LEAD BALANCES WITH THEIR ATTACHING FITTINGS SHOULD BALANCE THE PROPELLERS.
Music wire attaching fittings.
Lead weight shaped to smooth out contour of hub
Cement
DETAIL B
See detail B

SINGLE BLADED MODEL PROPELLERS D. Mertens

On one other occasion, a lad who broke his propeller and not possessing a spare one flew his model with half a propeller in the contest and lo—he won first place. Many modellers who witnessed the flight considered it a freak one, but some gave the strange phenomena serious thought. To the author the solution of the single bladed propeller idea offered a challenge and a great deal of experimenting was carried on over a period of time in order to develop a simple and positive method in order to make a satisfactory single blade propeller. Finally, the type of propeller and the method shown in this article was evolved. Of the two types, the one in which the stove bolt is used as a counter balancing weight proved to be most satisfactory and efficient.

A block is required which is only 5/8 as long as the ordinary two bladed propeller. Other dimensions, such as the block width and depth, should be the same. Carve the single blade as you would any two bladed propeller. When cutting out the hub, be sure it is made according to the sketch. You may use either type of balance shown. If the stove bolt balance is to be used, select a bolt of sufficient size and length to balance the blade. Then drill a hole into the hub extension 1/16 of an inch smaller in diameter than the bolt, being sure the hole has the proper depth. Then screw the bolt into

(Continued on page 46)

Academy Of Model Aeronautics

A Division of the National Aeronautic Association

OFFICIAL MODEL AIRPLANE NEWS FROM ALL PARTS OF THE WORLD

TWO resolutions adopted by the N.A.A. Air Congress at its first annual meeting in Denver, July 7-10, are of much interest to model flyers and leaders everywhere. The two resolutions which were unanimously adopted by the leading air men and air women gathered for the Air Congress concern the Academy of Model Aeronautics and the N.A.A. Avions, a junior aeronautical group sponsored by the Southern California Chapter of N.A.A.

The resolutions are as follows:

"WHEREAS The Academy of Model Aeronautics, a Division of the National Aeronautic Association, has grown phenomenally during the past three years; and

"WHEREAS through the activities of the Academy of Model Aeronautics the youth of the nation is becoming more aviation conscious and better versed in the art of flying and in all of its corollary problems; and

"WHEREAS it is believed that by encouraging this type of activity the youth of the nation will be far better equipped to take advantage of and aid this new and tremendously important science;

"IT IS RESOLVED that all of the members of the National Aeronautic Association, individually and collectively, in chapters or otherwise, are strongly urged to lend unlimited assistance to and cooperation with the Academy of Model Aeronautics to encourage the youth of their communities to join the Academy of Model Aeronautics and to participate in their local, state, and national activities."

The second resolution was as follows:

"WHEREAS the needs of commercial aviation and preparedness for National Defense depend essentially upon providing competent personnel through every possible means available, and

"WHEREAS a continuation of any aviation expansion program, whether military or civil, depends upon proper training for the youth of the nation to supply future personnel for all phases of the industry; and

"WHEREAS an organization for this purpose now exists, known as the N.A.A. Avions, having been sponsored and developed during the past four years under the direction of an N.A.A. chapter with definite success:

"THEREFORE LET IT BE RESOLVED that the National Aeronautic Association endorses such projects and encourages the state and local councils, chapters, and affiliated organizations, in the interest of long-range planning for both civil and military aviation, to undertake wherever practical the promotion and sponsorship of a youth movement such as the N.A.A. Avions to stimulate the development and training of American youth between the ages of 15 and 21 in all spheres of aviation activity and to enable these youths to orient themselves with respect to Aviation in preparation for an aviation career."

Among the daily correspondence received at Academy Headquarters, Willard Hotel, in Washington, D. C., are letters which are of particular interest to aeromodelers. Since these views many times reflect the thoughts of other aeromodelers this opportunity is taken to present a few of the communications here:

"Yours for more A.M.A. rules of the 1940 type. They are a boon to better models." —Paul Porter and Frank Carpenter, Auburn, Nebr.

"Speaking for the San Diego Aeroneers, myself as a member of the Academy, and many others, the writer would like to bring to your attention a new rule concerning the engine run of gas model contests, and how the San Diego Aeroneers have solved in a nice manner the past difficulties regarding contestants who cut their engine run so close as to have over 20 sec. clocked against them, thus disqualifying them.

"Here is the rule, as originated by the San Diego Aeroneers and now becoming practically universal in this state, where the meets are held not under N.A.A. rules.

"ENGINE RUN ALLOWS—20 to 22 sec., inclusive. If over 20 and not surpassing 22, 25% of total credited flight to be deducted.

"In this way, a contestant and the official timing, both remain happy as it makes it very fair to all involved. You know it is a fact that often an official clicks an engine run cut when the ship is downwind pointing away from him or other engines are running so as to cause him to be sloppy to the extent of 2 seconds easily, which is commonly known as the "human element." What happens—the victim of this condition is getting a nice flight and runs up and down the field swearing the engine ran only 18 or 19 sec., which in the majority of cases it did. And we find that no one is interested in purposely trying for that extra 2 sec with a 25% penalty effective, but if he slips on his timer calibration or the official errors, the entrant still gets 75% of his flight.

NATURALLY, HOWEVER, A MOTOR RUN OVER 20 WOULDN'T QUALIFY FOR AN ACADEMY RECORD."

—Elbert J. Weathers, Los Angeles, Calif.

"I think the model insurance is the biggest step in modeling that has been taken to date. I hope that after a while it is made compulsory for everyone holding an A.M.A. license to also have model insurance."—George Andrews, Jackson Hts., L.I., N.Y.

The following is an editorial which appeared in the "Virginia Modeler."

SHOULD THE V.M.A. JOIN THE AMA?

By Rut Fuller

Every year about this time the old question arises as to whether the V.M.A. should or should not continue its membership in the Academy of Model Aeronautics.

The discussion fired again during Norfolk's James Dixon Memorial Contest June 16. Leaders of the participating clubs questioned the advisability of sanctioning the proposed Middle Atlantic States Gas Model Championships, to be sponsored August 11 by the T.G.M.A. and V.M.A. championships, tentatively scheduled for September 1 at Langley Field.

As members of the affiliated clubs of the V.M.A., we pay, individually, into our club treasuries, a usual $1.00 membership fee and 25 cents dues per month thereafter.

Participation in the national model program costs us $1.00 a year. However little we seem to get for our money, this seems to be a very nominal sum for the privilege of associating ourselves with national model affairs.

A national, well-founded organization will continue to carry on the model program, in which we are so intensely interested, long after our modeling days are over.

If we want such an organization then, year after year, we should continue our participation just as we started it at the last Academy meeting when we were responsible for the rules as formulated for 1940.

We, somehow, always get around to adopting the national rules for our own use in the end. Common sense tells us that this participation and further scientific effort will gain for us even higher ideals in the Academy. Our very next move should be the sponsorship of our own radio system of timing to determine winners of model meets in the gas categories.

We are not dealing with a select group of experts as in past days, but with thousands of model builders of all ages, in every walk of model building from beginner to expert, in every part of the country.

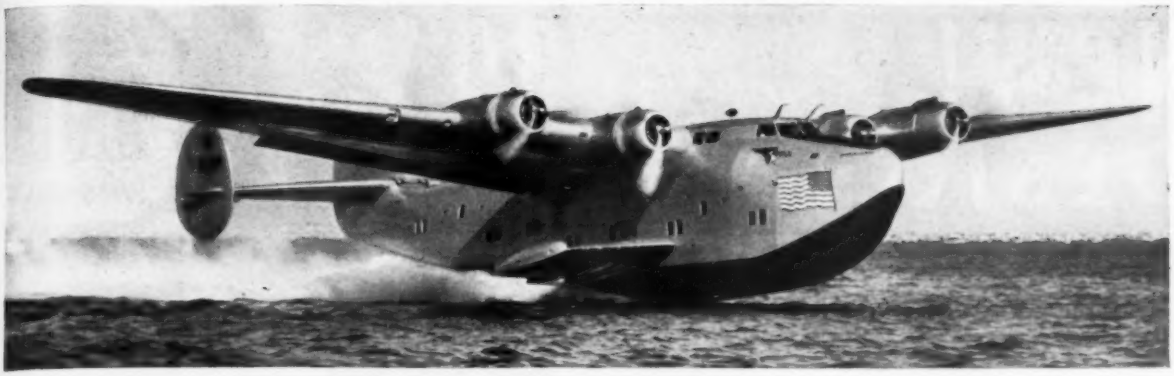
Regardless of pros and cons of the argument, Virgina membership in the Academy continues to grow year after year.

We have gone this far. There can be no half way. Let us get off the fence and make the Academy OUR Academy.

E. N. Angus of Oaklyn, N. J., believes in not only running bangup competitions for model flyers as is exemplified by the South Jersey Gas Model Association meets, but also has met the demand of model builders in his vicinity to learn more about aviation and flying in particular. Recently he wrote:

"I have never told you my plan in the

(Continued on page 38)



The American Clipper leaving Los Angeles on its trail blazing 4 day flight to Auckland, New Zealand July 12th. Only mail was carried on this first flight

FLASH-NEWS

SPECIAL TO MODEL AIRPLANE NEWS:

PRESENT military aircraft production rate in the United States is approximately one thousand planes per month, according to William S. Knudsen, chief of the President's War Production Board. This figure will be stepped up to around 1500 planes per month by early this Fall, which will give America a production rate of the world's finest military planes of approximately 18,000 per year: Germany's present total!

Construction on Vega Airplane Company's new three and a half million dollar plant on Union Air Terminal, Burbank, California has begun. Although sub-assembly fabrication work will continue on engine mounts, firewalls, cowlings and exhaust manifolds, main purpose of the expansion is to handle the thirty million dollar order from the British Purchasing Mission for a large quantity of Lockheed Vega 37 Bombers, a heavier and faster edition of the famed Lodestar transport. This sub-contract by the parent company, Lockheed Aircraft Corporation, is to clear their decks for Air Corps orders for twin-engine bomber and interceptor pursuit planes.

First of the newly-formed Northrop Aircraft, Inc.'s two-seat single-engine patrol-bombers for the exiled Norwegian government in London is nearing completion. The initial order for 24 will be delivered by October 15 to the London headquarters of the defeated nation which is, however, still technically at war with Germany. Officials of the government state the ships will actually be put into service by Norwegian pilots and flown against Germany's fighting pilots. The ship is strikingly similar to Northrop's famed A-17 attack ship with the exception of the landing gear which is composed of twin cantilever all-metal floats. Wing span is 47 feet 9 inches and the ship is 34 feet long.

Offering $500 per flight and guaranteeing two flights per month, a commission is now in this country to solicit ferry pilots to make the 2300 mile over-water hop from Newfoundland to London in Lockheed bombers for the British Air Ministry. Qualifications are exact, however, and previous military and over-water experience are required.

After long and vitriolic litigation, Reeves Field, located on Terminal Island in Los Angeles Harbor, has been condemned by the United States Navy and the acquisition price has been set at $300,000. The vast Naval Aviation base has been in use for three years and improvements and additions continuing daily. However, City Councilmen refused the Navy's offer to purchase the property on the grounds it interfered with shipping and harbor commerce facilities. The change of title automatically authorizes the completion of the Navy's program, which will add new hangars, shops and facilities for handling shore based planes of the carrier division.

Howard Hughes famed Round-the-World Lockheed 14 transport is now on its way to England as a modified Hudson-type bomber. The ship was sold to the British Purchasing Mission by Charley Babb, who purchased it from Hughes a few months ago.

Latest and biggest Naval Air Base in the Territory of Hawaii will soon be under way at Barbers Point on the Island of Oahu. Comprising a total of 2700 acres, the huge plant will be used to accommodate shore-based planes from the aircraft carriers stationed in the area.

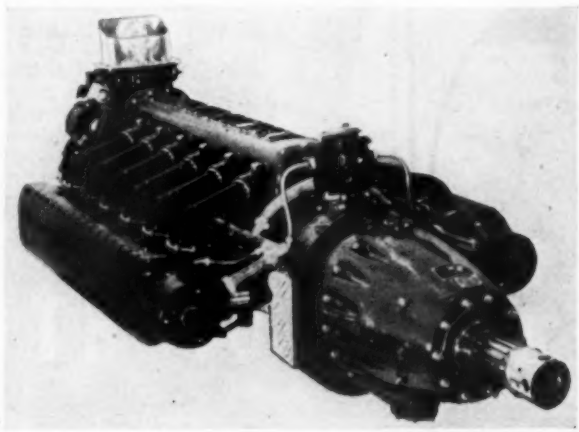
H. W. Rohl, millionaire Los Angeles contractor, likes the air, but more than that he likes privacy. So when he decided his business called for an airline trip to New York City he chartered a 21-passenger United Mainliner at a cost of $2788. Only the pilot, co-pilot and stewardess were aboard, the latter stating that: "He slept most of the way!" The regular fare for the trip is just $120!

Airline Travel UP! United Airlines flew a total of 25,234,000 revenue passenger miles during the month of July, 4% above June and 52% over the July figure of one year ago!

With their eyes far into the future of aviation, Los Angeles' Regional Planning Commission has submitted a "Master Plan for Airports" to the Board of Supervisors which calls for the construction of 19 new airports and seaplane bases and the improvement of 22 airports already in existence. Their predictions: Today there are 4800 persons-per-plane, tomorrow there will be only 600. Today's private plane sells for $2,000, tomorrow it will cost only $500. Today's transcontinental air time is 13-1/2 hours, tomorrow's only five. Today's airports are huge terminals miles from the heart of the city, tomorrow's will be large numbers of small "feeder" fields serving the main terminals, these feeder fields to be located generously throughout metropolitan areas.

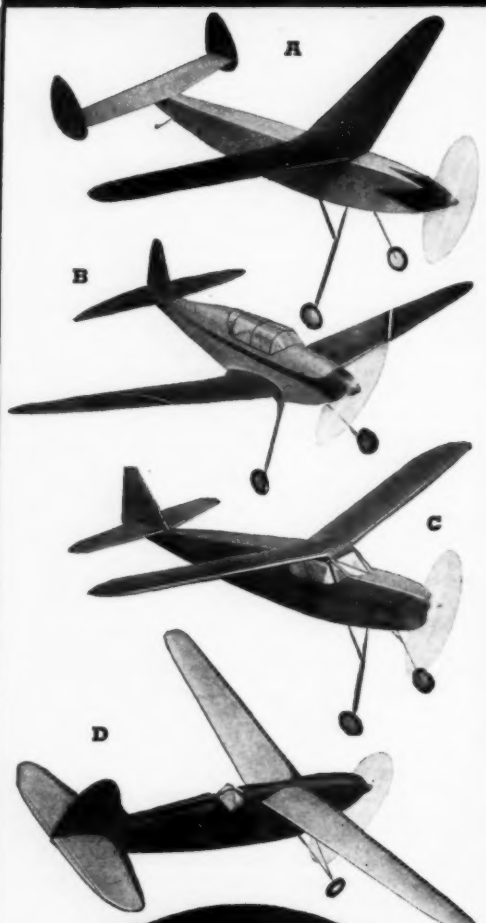
Vultee Aircraft Corporation of Downey, California has purchased the rights and assets of Stinson Aircraft Company, including the newly erected plant at Nashville, Tennessee. No

(Continued on page 72)



The new Aviation Manufacturing Corporation's "flat" 1200 h.p. engine which can be housed within the plane's wing. Drag is reduced and flying speed is increased about ten percent

NEW! Scientific's 30" MODELS DESIGNED TO FLY!



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A. WHIPPET. Ultra modern in contest type design, this Whippet is hard to beat when it comes to endurance. Incorporates such advanced features as: swept back wing, twin rudders, simple and efficient landing gear. Its red wing is adjustable and detachable. Rudders red, fuselage and stabilizer white with red trim. 50¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .

B. BULLET. The fastest thing on wings! If you want a model with class, zip, and yet easy to build, get one of these new Scientific "Bullets." A pursuit type plane with a low, streamlined, tapered wing; movable tabs on tail surfaces; single strut landing gear; easily constructed enclosed cabin (including instrument panel). 50¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .

C. YELLOWBIRD. A contest type model, designed for consistent endurance flights. Employs the under chamber swept back wing—movable and detachable. The fuselage is extremely easy to construct. Here's a model that will make your fellow contestants take notice at the next contest you enter. Be the first on your block to fly it! 50¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . .

D. CLARION. A scale type model, designed primarily for flying. Wing is stationary and faired into the fuselage. Tail surfaces are designed with movable tabs insuring easy directional control. Her color combination of yellow wings, blue and black stabilizer, blue fuselage and rudder, gives her that classy custom built appearance. 50¢
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Wing Area—372 sq. in.
Length Over-All—34½"

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A. FURY. A really beautiful model that gives much pleasure building, and hours of enjoyment in the air. The Fury is easy to build and a real flyer too. Wing and stabilizer light blue with red trim. Body and rudder all red. 25¢
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B. SKYSCRAPER. In her trial flights she consistently made altitude flights of over 500 feet. Fuselage, brown and white, wings and tail surfaces all white with brown trim. Her twin rudders assure greater spiral stability. 25¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .

C. RAVEN. Easy to construct, even for a beginner. Her diamond shaped fuselage and elevated polyhedral wing assures contest winning flights. Fuselage and rudder covered with light blue tissue, wings and stabilizer yellow. 25¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .

D. SCIENTIFIC R. O. G. An advanced type R. O. G., with built up wing and tail surfaces. Look at that polyhedral wing, the wheel pants. Wing and stabilizer all yellow, trimmed with blue, rudder and stick blue. 25¢
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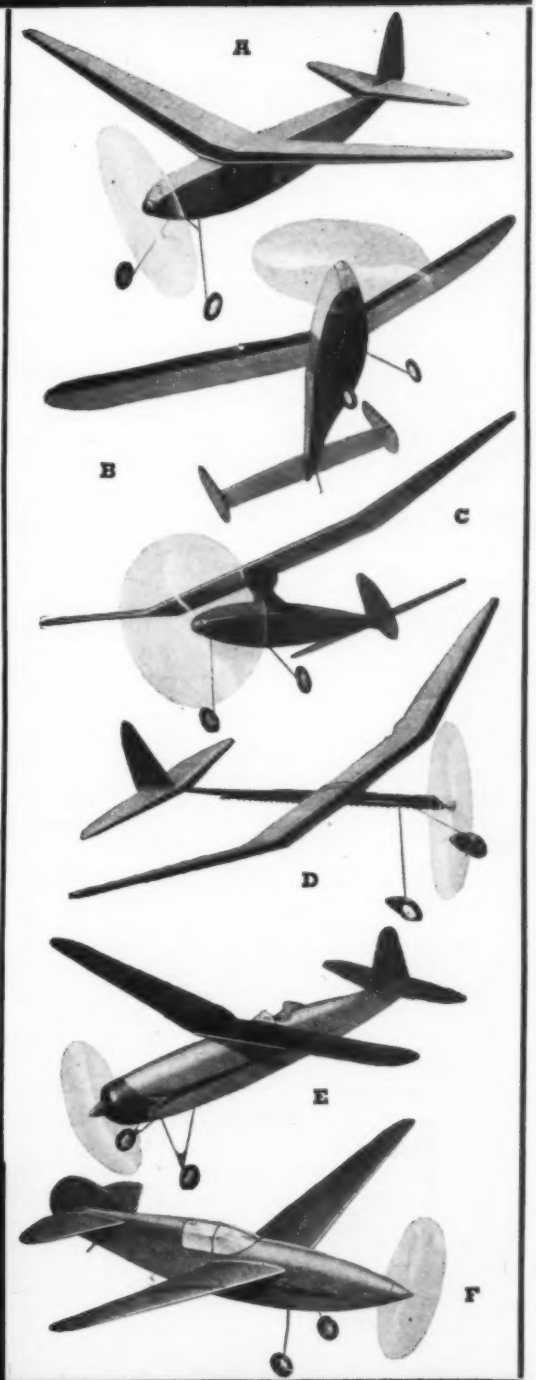
E. SPEEDSTER. A speedy, graceful model that is a consistent and steady performer. Takes off from the ground within three feet. Parasol wing type, with open cockpit. Red wing and tail surfaces, fuselage white with red trim. 25¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .

F. LIGHTNING Everything the name implies. The Lightning is one of the fastest flying models ever designed. Easy to build, too. Adding to her streamlined beauty are red lightning flashes on her yellow wings and fuselage. 25¢
COMPLETE KIT POSTPAID OR AT YOUR DEALER . . .



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38" Class "A" $1.75
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M&M Wheels Included
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78" Class "C" $4.75
With 4½" Ohlsson Wheels $5.95
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The Class "A" model has ready finished balsa sides, the "B" and "C" models are of the strut and longeron type. Easy construction and accurately ready cut out parts insure contest performance.

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Academy of Model Aeronautics

(Continued from page 34)

club. It is this. When I went into the thing there were twenty members and no money at all. We now have 73 with 12 to come in next meeting and some hundred dollars saved up in the treasury. I have six boys taking flying lessons. When we reach 150 members, each is to pay 25c extra per month toward a cup. I have promised to buy the ship when they get that many members. I feel it will give a chance to many that cannot afford to take lessons and we can make money for the club as well. I have a good instructor who will take the ship and use it during other spare time to pay for our time. If the S.J.E.M.A.A. owns its own ship it will be real evolution.

From Elgin, Ill., Gifford M. Holden, Jr., passed along the following interesting information concerning his organization:

"Our club has had two meetings already. We meet at 254 Villa Street each Monday night from 7 to 10 p.m. The club spirit is great. Although our city's population is over 36,000, the town is not very air-minded. Our city has no airport, although Benny Howard and an airport of ten planes in a nearby small town offered to move here if a Municipal airport was made. Little has been done about it except by a few air-minded citizens. A club in our high school has done much for starting young boys on the way in model building. I founded that club in my freshman year of high school and was an officer for all four years. We started from scratch, thinking we were good when flights of 15 sec. were made in the gymnasium. We advanced little by little until "mic" jobs and gas models came to town. Most of the boys listed went to many contests around here and Chicago last summer with me. All the boys have gas motors (a few have 3 or 4). (All indoor flying is done in Elgin's new National Guard Armory where we fly on Saturdays and Sundays. It is 25 ft. high at the sides and about 40 ft. in the center with a floor size of 100 ft. by 140 ft.)

I think our N.A.A. authorization and an appointment of a contest director here would help us put Elgin on the aviation map by bringing aeronautics before the people's eyes."

From Belmont, Mass., Hewitt Phillips, who is now located at the N.A.C.A. Laboratories in Langley Field, Va., wrote:

"I have been considering several possible ways of improving gas model endurance. You see, the rules allow a twenty second motor run but say nothing about whether the model shall stop climbing after 20 seconds have elapsed. This allows the use of flexible couplings (otherwise known as rubber motors) between the propeller and the engine. Such devices would, of course, be used to improve the weight distribution and streamlining of the model."

"I have been doing some research into early N.A.C.A. reports on airfoil tests made from 1915-25. Much work was done at gas model speeds. The main conclusion is that thin airfoils are far superior to anything else. Among the best are the Sloane, and the Gottingen No. 57 and No. 81. They are superior to the commonly used Clark Y. Sections with a bulged leading edge and thin trailing edge, like the R.A.F. 32, which Frank Zaic popularized, seem to be the worst of all in these fairly low speed tests."

One of the most interesting models to be brought to the attention of Academy officials is an outdoor stick model built by Norman McMorrow, Jr. (A.M.A. 5039) of Washington, D.C. The ship which Academy officials were privileged to see fly had as its stick a 1 1/2" outside diameter mailing tube whose walls were 1/8" thick. The length of the stick, including the tail surfaces was 24 1/2", the same as Cahill's Clodhopper. An 18" two-blade folding propeller was utilized and the wing was a two-year-old Korda design affair. With power of 40 strands of 1/8" flat rubber, the model weighed approximately 8 1/2 oz. using a 200 square inch wing.

The first test flight of the model resulted in a 3-minute performance on hand winds. In an official contest the model flew for 8 min. 50 sec. on its first flight and was lost on a second flight of 8:14. To give an average contest time of 5 min. 54 sec. which was good enough to win first.

So the next time, modelers, that you see a mailing tube lying around the house, don't throw it away. It may be you will have a championship affair.

It is not often that the Academy of Model Aeronautics loses a chapter and then it could be expected that the A.M.A. would not be too happy over such a loss. There is one chapter, however, that definitely the Academy was glad to lose and that is the former Winged Motors Club of Kansas City, Mo., whose senior advisor was Mr. C. R. Mooney, district vice president of the N.A.A., and secretary-treasurer of the Southwest Aviation Conference. Mr. Mooney informs us that almost every member has graduated into an aviation job and it certainly is inspiring to know that the model aviation training of the Winged Motors members has resulted in their going into the aviation field.

It is with considerable pleasure that the continual participation of girls and women in model aircraft competitions is recorded in the official meet reports received daily by the A.M.A. One of the most consistent winners in the Pennsylvania area among the lady flyers is Mrs. Samuel F. Andes, of Birdsboro. Mrs. Andes passes along the information to readers:

"Yes, I have indeed had lots of fun the past summer months helping to build, fly and sometimes break up model planes.

"My husband has built quite a few nice planes. Some of the Reading boys (model builders) call us the "straw benders" as there are very few plans used. We just bend a few straws, as they say.

"My first thrill was flying a plane down in Baltimore, Md. We flew all day long and did we get sunburned? My husband won second place and I came third, which certainly pleased me, since it was my first contest.

"The next meet I attended was up in Reading. I just couldn't get any time at all.

"Our club, Pottstown Gas Model Club, had the next meet which I was able to attend. I won for myself a lovely Emerson radio as second prize.

"Next trip I made was up at Stenton Island and did the wind blow. Ask the boys. It upset my plane; she came down in a power dive, broke the wing and damaged the fuselage quite a bit. Mr. Andes said, 'Well, you can go to work and build a new wing,' which I did.

"Now for the Philadelphia meet—it was grand and indeed there were lots of good

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$7.95 Postpaid

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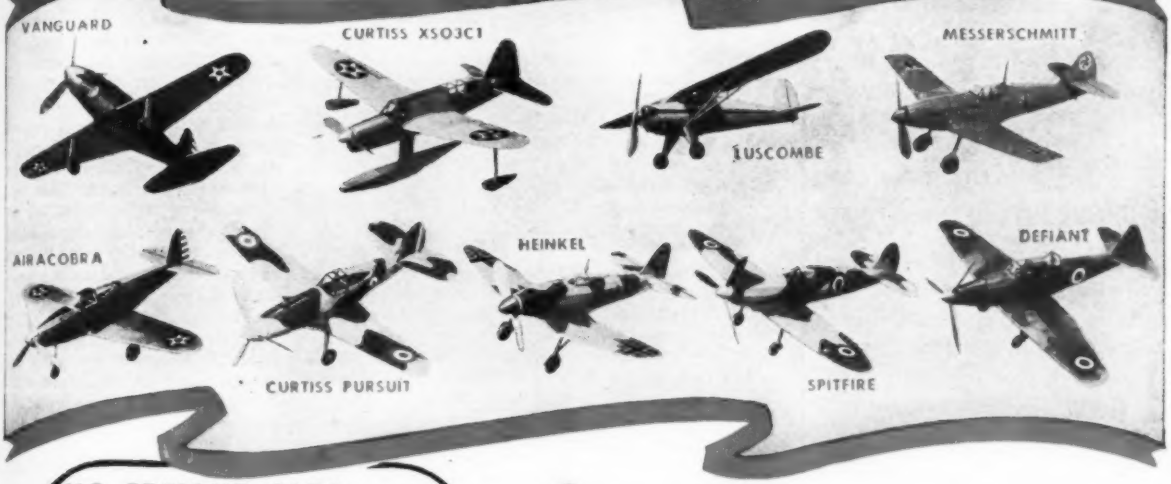

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RUBBER ROADBED: Shapes easily to curves. Makes a true, firm, realistic roadbed. **18" lengths 20c**

Special Rubber Cement for laying Track Sections and Rubber Roadbed . . . **10c**

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Included in the line are such famous names as Airacobra, Spitfire, Defiant, Curtiss Pursuit, Heinkel, Messerschmitt, Vanguard, Luscombe . . . and a sensational new sailplane with 28" wingspan.

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FOR THE BOY ON THE LEFT, BUT A HAPPY ONE FOR THE BOY ON THE RIGHT!
"SMITH COILS" THE BEST.
I KNEW I SHOULD HAVE USED ONE OF THEM NEW SMITH COILS!
IM SURE GLAD I USED ONE OF THOSE NEW COILS! MY THANKS GO TO N.R. SMITH & CO.

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ships there. I was happy with a cup and O.K. motor which Mr. Berry, Jr., presented me as second prize.

"The last contest which I entered was over at Trenton, and I brought home third prize.

"As I have two small daughters, I don't have very much time to build planes, but I love it. It seems I just can't wait until next summer to visit the meets.

"I am working on a Klowd King which I won over in Trenton in which we want to use the O.K. motor won down in Philadelphia."

"While I am at it, Mr. Lewis, I would like to mention to you that we have some keen model builders in our club. They stick to the ship to the end.

"There are more and more going in for this sport every day, so here's wishing good luck to everyone and I hope to get some good flights myself."—Mrs. Samuel F. Andes.

Hydro Flying

With sunshiny days beckoning the aeromodeler, many enthusiasts are finding a new thrill in organizing and participating in the now popular rise-off-water events. Whether for competition or just for fun of flying these aquatic models, groups of adults and youngsters are off on Sunday and holiday parties with a lunch basket under one arm and hydro models under the other.

Seaplane or hydro contests (how about "lakeplane" and "riverplane"?—Ed.) were introduced last year on a large scale. The combination of hot weather and cool water is a happy one and a sojourn to the lakes or seashore with the family is an interlude which all modelers can look forward to with pleasure whenever the thermometer soars skyward. Though there are many problems associated with these rise-off-water craft, such as the center of gravity position with respect to the buoyancy characteristics of the floats, best angle of trim, step location, angle of attack of the airfoil section for a speedy take-off, type of propeller for best climb and other puzzling pointers not yet clearly understood, aeromodelers quickly grasp what may be wrong with their initial designs and take corrective measures so that after a few trials the models behave like water birds.

Contestants in the 1940 National Model Airplane Championships will be interested in knowing that a complete listing of performances in each event are compiled for the first time in the history of the sport and have been made available in Volume 4, Number 7, of the Academy's monthly bulletin, *Model Aviation*.

More than 5000 listings were necessary for the 32 categories which were flown off during the 13th Annual National Championships. A copy of this bulletin is available to readers of MODEL AIRPLANE NEWS who send 25c with their request to Academy Headquarters, Willard Hotel, Washington, D.C.

This same issue of the Academy's publication also presents a copy of the new by-laws of the new Academy, together with other pertinent and useful information for club leaders and activity directors.

A Fighter Afloat

(Continued from page 33)

was re-designed somewhat and the Vought V-150 single-seat export fighter was a slower yet safer model. Lower powered, a larger vertical tail surface area and somewhat simplified design, the V-143 and its sister ship, the V-150 were never ordered.

However, working in close cooperation with the Naval Aircraft Factory, pioneers in structural design, the design was once again modified and the present version is now undergoing its preliminary company and Navy test procedure under the sobriquet "XF4U-1," which, as you know, means the first model of Vought's fourth fighter design for the Navy.

Many radical departures from fixed custom flavor this little ship. But each departure is a solution to a problem, not an engineer's whim at a drafting table. Most striking feature of the XF4U-1 is its novel inverted gull-wing front profile. What problems did this solve? A lower center-of-gravity, for one; a shorter landing gear making the carrier deck arresting procedure surer and safer, a better solution to the problem of wing-to-fuselage streamlining, and aerodynamic advantages in the shape of reduced in-flow of air towards the fuselage, insofar as air, a fluid just as water, will not flow uphill without tremendous pressure, particularly at high speeds.

Second outstanding characteristic is its hull or fuselage structural design, being the first full monocoque spot-welded high powered ship yet produced. This, the Naval Aircraft Factory personnel contributed.

Its landing gear is one of the first fully retractable types utilized on modern single-seat fighters insofar as it retracts in the normal vertical position and is completely sealed off from the airstream by clam shell doors.

This innovation was first used in modern design on the Douglas B-23 medium bomber, of which 33 have just been put in service by the Air Corps.

Power is supplied by a huge Pratt & Whitney R-2800 double-row air-cooled radial engine composed of eighteen cylinders so staggered as to allow each to meet the airflow from the cowl. This, the largest air-cooled engine yet installed on a service-type airplane, develops 1,850 horsepower for take-off with a maximum duration of five minutes and at a manifold pressure of 39 inches of mercury. Normal rated horsepower is 1,600 at 20,000 feet.

This power is delivered to a three-bladed all-metal Hamilton Standard constant speed propeller, the pitch regulating and changing mechanism being actuated by hydromatic control.

The propeller is of stainless steel; however, the motor has been cadmium plated to prevent the corrosive action of salt water.

The engine cowling is of the complete circle full contour detachable type and is equipped with cowling cooling flaps to maintain low engine temperature when climbing or taxying.

The engine is mounted to the four fuselage attachment points by a welded chrome-molydenum steel tubing engine mount. The front face of the mount is flat and is equipped with eight mounting lugs to which the engine is bolted. A special adaption of the Lord type engine mount vibration absorber is used which permits free torsional vibration of the giant engine with a minimum of longitudinal displacement at any engine speed.

The oil tank is supported in the power plant compartment just forward of the firewall which is located across the width of the fuselage at a point one-third to the rear of the wing leading edge. The tank has a capacity of 14 gallons of oil with foaming space providing for a total of 17 gallons.

The fuel pump is located on the right side of the engine accessory drive gearing, the oil pump within the engine itself, and the hydraulic and vacuum pumps on the left side of the gearing. The machine gun synchronizer impulse generator is located on the right vertical drive pad and on the left hand side tachometer drive pad.

The wing is of full cantilever inverted gull design being built up on a true single-spar monocoque frame. The ribs are of

A BEAUTY!

TIGER AERO

ALL BUNCH MOTORS 45/100 CU. INCH DISPLACEMENT

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NEW TIGER VICTORYS
Report for July from Los Angeles Gas Model Airport. "Tiger motors powered every 1st place ship at 5 weekly contest July 4th, 7th, 14th and 28th." Tigers 1st in 5 successive contests — an unequaled record for consistent winning!

DOUBLE VICTORY
Bill Hinshaw, New Class "C" second place National Champion at Chicago wins 1st place, Second Annual Midwest Meet, Omaha, Nebr., July 21st. Both events won with Bunch powered Zipper.

TIGER AERO
$16.50

The magnificent workmanship, excellent proportions, compactness of design shown in the above TIGER photograph speaks for itself.

In the TIGER are embodied the cumulative experience gained by the Bunch Motor Company engaged for years in the production of one basic optimum size engine. This optimum size Tiger—neither the miniature class "B" nor the massive class "C"—is rated at 44/100 H.P. and thus outperforms both classes.

Witness the impressive TIGER performance at model dealers. Send 20c to address below for technical information on latest intrinsically sound Bunch developments. Know about the optimum size engines with "big" engine performance.

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RACE CAR ENGINE
$16.50

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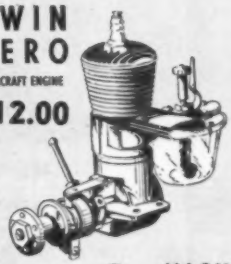
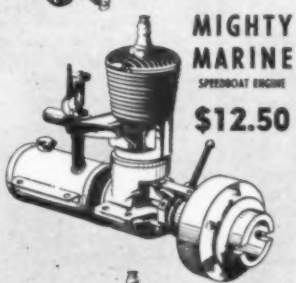


MIGHTY MARINE
SPEEDBOAT ENGINE
$12.50



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RACE CAR ENGINE
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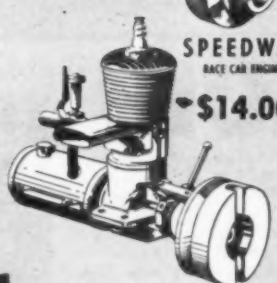

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31½" Soaring Glider has turned in many flights of better than one hour. Kit complete. Add 10c Postage..... **25c**

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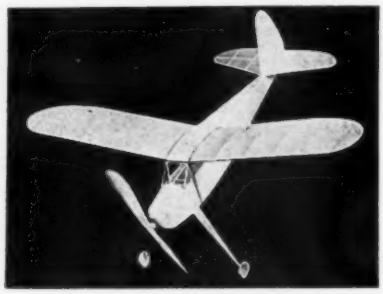
Newest Modelcraft Sensation! With a 26" span the Record Wrecker includes freewheeling unit, rubber lube, contest rubber, best quality balsa, cement, dope and large full size plans. **Add 10c for postage..... 50c**



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W. R. Butterfield of Los Angeles made a flight of 2 hours and 40 min. with his Cloud Haunter.

30 in. PACIFIC ACE

A practical and durable commercial model. Easily constructed from well drawn and detailed plans. Kit contains an ample supply of first grade wood and high quality cement. Comparable with and outflies most dollar kits. Add 10c for Postage..... 25c

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3" wheels $6.00
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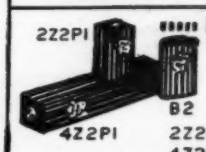

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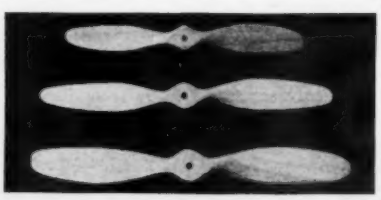
Machine made from straight grain hardwood. Show from 20 to 30% more thrust in every test than any other prop. Put one on your ship and see it climb faster than it ever climbed before. Sold by all dealers and distributors who want to give you the best. Stock up now. Complete range of sizes, 9", 10", 11", 12", 13", 13½", 14", each..... **15¢**



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Bores will be filled a custom as soon as reverse start.

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You'll Soon Find Out —

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The first model that can handle an Ohlsson "60" at full throttle.

Frank Hogan of Baton Rouge, Louisiana writes: My Spook 72" powered with a Super Cyclone, won for me 1st place, and an Ohlsson "60"!

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Wing span, 46". **DeLuxe Kit** contains spun cowl, silk, 2½" Voit Air Wheels, cement, dope, die-cut ribs, plenty of good balsa, and full size plans. Price **$3.95**

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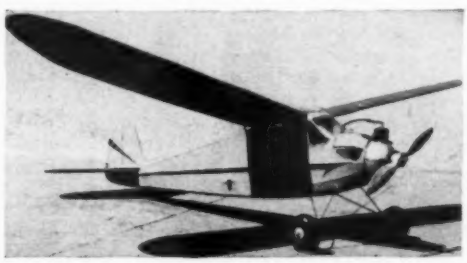
PLANS ONLY 25c

WHEELER FIELD, HONOLULU, HAWAII June 2nd You Choy Farm and Lin You Farm, won 1st in Class "A" and 2nd in Class "B" with their nifty little Miss Tinys.



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Designed for Class "B" engine such as Ohlsson 23, Torpedo, Junior Motors Brownie, this model in its test flights did 15 minutes on a 12 second engine run. Has taken many firsts, including the recent Fresno contest. Wing span 54", chord 7". Kit complete with cement, dope, covering, formed landing gear, air wheels, spun aluminum cowl, etc. **$3.85**

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SPOOK 48" Specifications: Wing Span 4 ft.; flying weight with Ohlsson "19", 18 oz. Wing loading 8 oz. per sq. ft. Can be flown as class "B" with Ohlsson "23," Hi-Speed or Brownie. Kit complete with cement, dope, covering and wheels **$1.50**

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SPOOK "72". Sixty-three night flights (no thermals at night) average over 1 minute each using 8 second engine run. Wing span 6 ft.; flying weight 3 lbs. Power with Brown, Ohlsson "60" or other class "C" engines. (The first model that can handle an Ohlsson "60" at full throttle.) Kit complete with cement, dope, covering and wheels **$3.95**

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66 in. tapered wing. DE LUXE KIT contains tapered spars, beveled and tapered trailing edge, die-cut ribs, turned aluminum cowl, 1 qt. gas dope, 1 pt. cement, 3½ yds. super silk, formed landing gear, 4½ in. inflatable air wheels, dural wire, alum. tube, washers, bolts, haskelite, dural sheet, hook up wire, switch, selected hard balsa, full sized, black and white, plans with test flight instructions, complete **$8.50**

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The ONLY coil with safety gap! Blasted all competition. 2 Oz. Delivers extra efficiency on "B" and "C" engines—3v. operation. With hi-tension lead.

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EXCLUSIVE

We are proud to announce our appointment as NATIONAL DISTRIBUTORS for these new, specially designed miniature engine plugs. New non-spreading, heat-resistant electrodes. Hi-tension clips or straight wire connections. No. 2 for Class "A" and "B." No. 3 for Class "C" 65¢

7 DIFFERENT CUTTING EDGES & KANTSLIP HOLDER, Complete 50¢

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6 24" x 36" Sheets 25¢

We proudly introduce this super-covering — stronger than best known bamboo covering. Exhaustive tests show tremendous strength —both WET or DRY!—in white, red, blue or yellow! A new achievement, economical, too!

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After rigid tests by well-known Prof. T. N. deBobrousky, these engines were approved by International Bureau of Standards for Performance, Upkeep, Manufacturer's Guarantee, Initial Cost and Replacement costs. When they pass these tests we add our guarantee and recommend them highly—

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ATOM $12.50	SYNCRO B/30 $6.95	SKY-CHIEF $6.95

OHLSSON '19'—CLASS 'A' $14.50
BROWN 'D' . . . $12.50; 'C' . . . $16.50

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Flight made by our rubber-powered "AIRFLOW 40" at an official contest at Cherry Hill, East Paterson, N.J., on July 14, 1940. This kit was built by Herman Carnails of Teaneck, N.J. The "AIRFLOW 40" was equipped with one of our

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Made of light-weight steel, drilled and perforated and now equipped with new mallable tabs for fastening. Put it on in a jiffy. Any size available—just state width of hub and length between hinging points. Drawings and detailed instructions.

For Double Blade 20c; For Single Blade 15c—Postpaid.

Send 3c stamp for free list on Contest Items

WATCH FOR THE "AIRFLOW 40" NEXT MONTH

DEALERS WRITE DEPT. 10A

Best By Test Model Co., 175 Main St., Ridgefield Park, N. J.

the pressed flange type and are divided at their center to allow riveting to the spar. The top and bottom surfaces of the spar are faced flat against the wing skin. The entire leading edge compartment of the wing is bolted on in one piece. The ailerons are of all-metal construction fabric covered and are aerodynamically and statically balanced. They are controlled by push-rods of the swaged end type, no cables being used within the outer wing panel.

The flaps are of the trailing edge type and extend between each aileron including the inner panel section. They are hydraulically operated. They are fabric covered with the exception of the upper surface of the inner wing panel section which is protected from damage by pilots and crew of servicing personnel.

Two oil temperature regulators are located within the leading edge of each inner wing panel in the "gull" portion. These consist of a flat core type radiator, thermal relief valve and expansion check valve mounted in each panel. There are no shutters or doors, the relief valves controlling the oil temperature automatically.

The landing gear is of the fully retractable type, each unit being mounted at the lowest point of each "gull" at the junction of the inner and outer wing panels. They consist of a single oleo leg, hydraulic brakes, torsion links mounted longitudinally inside each wheel, and retracting arms at each upper hinge. Retraction is by hydraulic control, the support arms being hinged at the middle and folding within the wing upon retraction. The tires are of the smooth contour type and are mounted to drop center rim Hayes wheel and brake assemblies. Large metal plates are affixed to the front face of each leg, expansion upon retraction being taken care of by small hinged plates at the fairing-to-wing attachment point. Two large metal doors of the inward-retracting "clam-shell" type are hinged below the under surface of the wing which completely seal the landing gear from the airstream upon the wing.

Two intercostal chambers are provided in the leading edge of each outer wing panel to accommodate machine guns and trigger motors. The entire wing structure is covered with aluminum alloy Alclad sheet flush riveted. Two wing-tip navigation lights are mounted flush into the leading edge and are of smooth contour.

The tail surfaces are of full cantilever design with fabric covered all metal control surfaces. Both rudder and elevator are of the balanced type weights being bolted into the leading edge of the cut-out section to provide complete static and aerodynamic balance. Control is by stainless steel cable.

The tail wheel is full retractable, being hydraulically controlled in unison with the main landing gear. A small diameter solid rubber tire is used and a short stroke oleo strut takes up landing shocks.

The radio antenna installation consists of a single cantilever mast mounted atop the fuselage at the firewall in the center of the fuselage. The tail mast is located atop the rudder portion of the vertical tail surfaces and is mounted on the rudder hinge line to lessen displacement in rudder control. The lead-in contacts the fuselage at a point mid-aft of the cockpit enclosure.

The cockpit enclosure is of the built-up frame type being composed of nine removable plastic acetate sheets secured by tubular rivets to the frame. In moving rearwards the hatch moves upward while sliding aft along the track provided.

A standard Naval Aviation cockpit arrangement has been provided. The control shelf is mounted low on the left side of the pit and includes the throttle quadrant including throttle, mixture control and propeller control knobs, the landing gear safely latches and hydraulic position levers, the elevator and rudder trim tab control wheels, the landing gear position indicator and the gun charging and loading handles. The command set radio receiver and transmitter are located on the radio shelf at the right side of the cockpit. The pilot's headrest includes the collapsible life raft, emergency rations, and signal pistol within the cylindrical tube. A regulation Navy signal pistol is mounted on the right side of the pit with a small cartridge holder housing six flares just above and to the left.

The fuel supply is carried in four seam-welded aluminum tanks mounted by straps in the center of each inner and outer wing panel. Total capacity of the forty gallon tanks is 160 gallons.

Total gross weight of the Vought-Sikorsky XF4U-1 is 9,146 pounds which gives a graphic picture of its small size and compact lightness. It has an overall length of 31 feet 6 inches and a wing span of 40 feet 3½ inches.

Preliminary performance figures indicate a top speed at 16,500 feet of 366 miles per hour with a cruising speed at 75% throttle of 324 miles per hour. The XF4U-1 has a cruising range with full naval load of 1,820 miles.

Due to Naval restrictions we are not permitted to give details of certain items of equipment, in other than general terms. Armament aboard the little ship consists of four machine guns mounted two side by side along the upper engine cowling and firing through tunnels past the propeller through the use of regulation Navy synchronizer units. In addition a single free-firing machine gun is mounted in each outer wing panel firing through small apertures in the leading edge of each. The caliber and ammunition load figures are not for publication. Details of the carrier deck arresting hook, which is located in the extreme aft end of the fuselage and which is completely retractable is likewise of a confidential nature.

The Vought-Sikorsky XF4U-1 Shipboard Fighter, after complete testing by the Navy, will fill a place now being vacated by the popular Grumman F2F and F3F single-seat fighters which have done such admirable work aboard the carriers. However, these are soon to be retired to be replaced with this smaller, faster and stronger fighter. After the analysis of reports of the British campaign in Norway, particularly at Narvik, the importance of carrier based fighting planes can most certainly be placed in a position of

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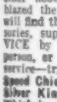

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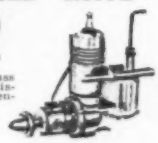

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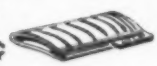

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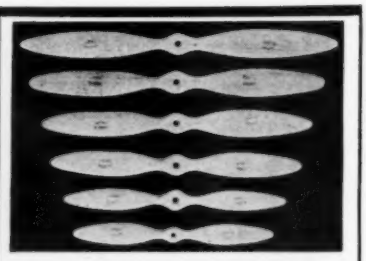

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Universal type. They will fit practically any motor on the market today. They give a very broad adjustment and in many cases will increase the engine's power. Only a few minutes are required for installing. Complete unit only.....60c

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A Single Blade Free-Wheeling Prop

(Continued from page 33)

the hole and cement it into place. Next drill the hole for the retaining wire, which wire may be part of the free-wheeling mechanism, insert the wire and cement it in place.

If the lead balance type of propeller is preferred, procure a piece of lead and cut it to the proper size and length. Then solder it on to the wire as shown in the sketches. Bend the wire and screw it to the propeller hub by cementing and binding it in place. Careful study of the sketches will disclose construction details of the counter balance weight and free-wheeling devices.

Gas Lines

(Continued from page 29)

test was put on by the winner of the meet, Russell Simmons. His ship was nothing short of remarkable in the way it climbed and soared over the field. There was no chance for Luck to play her part here, for every flight was beautiful to behold. The ship out-climbed everything at the contest, large or small. In picture No. 7 you see Simmons' ship at the moment of take-off.

In picture No. 8 Simmons may be seen holding it. One of the unique features of the ship was the folding propeller which operated without trouble. Another factor which probably contributed to the ship's performance more than any other was the propeller blades of large area. To the casual observer this would mean little; however to those familiar with the science of model aviation this feature was extremely significant. Russell's propeller, instead of merely turning the air in the climb, had sufficient area to drag the plane skyward without hesitation. The Baby Cyclone engine used was tuned up to the highest degree and gave tremendous power.

Simmons won the contest with a total of 86 points, earning him the Breeze Corporation Trophy.

On the whole the times were not high, due to the dead air and lack of thermals. The performances of the ships were due to their own excellent qualities rather than to any external assistance that Nature contributed.

As the observers went around the field many unusual types met their gaze, and the ship shown in picture No. 1 was one of the novel ones. As can be seen, the fuselage was constructed similar to a flying boat, the wheel being attached to this fuselage and protruding slightly from its body. On the body a pylon was mounted which held the wing and housed the engine. This ship was of excellent design and turned in some fine flights. Upon hitting the ground damage was reduced to a minimum by the false nose of the fuselage, which was supported from the rest of the body and held flexibly in place with rubber bands. Upon impact with the ground the nose acted as a shock absorber. We give this ship credit as being one of the most unique in design that has been produced so far. It shows considerable ingenuity on the part of its builder. Charles Hamilton.

In picture No. 2 you see the "Flying Cleaver" and its builder, Leon Shulman, who later won fame at the Nationals by taking first place in the Class A Senior Event with a model which was a duplicate of the one shown, except smaller. The design of this plane is about as perfect as one can expect and it is very stable under all conditions of flight. The low fuselage not only provides low lateral area, but extends far enough below the propeller shaft to allow the one wheel to be fastened directly to its lower longerons. This eliminates the necessity of landing gear struts and their resulting resistance when in flight.

Picture No. 3 shows a dramatic moment in George Gilchrist's life. Here his 6 foot version of the "Powerhouse" is getting underway.

Louis Garami was on hand with a new type of Class A fuselage ship, shown in picture No. 4. The fuselage was made from balsa sheet formed around bulkheads. The motor and landing gear were built in one unit, which fastened to the nose of the fuselage and was held in place with rubber bands. A narrow, light pylon supported the wing. Louis won fifth place in the Class A Senior Event.

The most unusual ship ever to take the air is shown in picture No. 5 with its builder, Frank Ehling. Frank is always trying something new and usually turns out winners. The ship shown is a twin engine job; a Class A engine mounted in the nose of the fuselage and a smaller Class A engine mounted at the trailing edge of the wing. A number of the contestants wondered at this arrangement until Frank informed them it was a combination Class A-Class B model. To fly in Class A, one motor was left dead or detached from the plane; as a Class B model both motors were used. This is one instance of the greater variety of designs which has been made possible by the new Academy rules which eliminate wing area as a governing factor. The ship flew very well; however, before it was fully tuned up, the mid-day shower ruined the wing covering.

Picture No. 6 shows the Headquarters Tent with model builders waiting to have timers assigned to them. Considering the number of contestants, there was very little waiting, due to the excellent organization of the contest.

Another ship of excellent design is shown in picture No. 10. Its builder, Kenneth Hjlen, is waiting anxiously for the model to lift from the run-way. It was a beautiful flier, with a number of excellent points of design; such as the wing which possessed sufficient, but not too much, dihedral that efficiency was lost. It was slightly parasol, the thrust line being fairly high and the side area comparatively low. The whole job had

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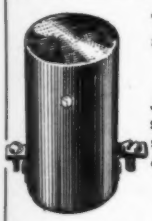

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The famous V, V-2, and V-3 plugs developed exclusively for high performance miniature motors.

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May be attached to any Brown Junior Motor. Clips over exhaust parts; and conducts exhaust away from fuselage.

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Walter Good, Kalamazoo
1940 Winner Edw. Roberts Trophy

NATIONAL WINNER—AGAIN

This is Walter Good. Walter won the Edward Roberts Trophy for Radio Controlled models at the Nationals this year. He won a check for $100, too! His eight-foot model was constructed with greatest care, and so, of course, it was powered with a Brown Junior Motor.

Year after year important awards are won with Junior Motor equipped planes. It's easy enough for you to be up there with the winners. There's a Junior Motor for you in every class and every price range. All motors are run-in at the factory and sealed in tamper-proof containers. Send in the coupon below and learn how you can be the owner of a prize-winning motor.

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"THE Tom Thumb gives efficient performance for big flying events. There are lots of angles to figure in seaplane competition. The take-off and landing must be without nose over. While the motor run is unlimited official flights must start from and land on the water."

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"As all my friends and customers know each Tom Thumb is built to give this type of expected results."

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The Tom Thumb is the most powerful easy starting 1/5 H.P. engine made. Clip the coupon below, enclose money order for $7.50 (also your old motor for special $6.00 offer), and receive a *brand new* assembled and block tested Tom Thumb. Complete with fuel tank, coil, Champion spark plug, one piece cylinder and head and other modern features. Complete flying weight 10 oz. (less batteries). Bore 7/8"; Stroke 3/4".

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☐ Rush me one new Tom Thumb Engine. I enclose $7.50.

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I intend to run my Tom Thumb— ☐ Upright ☐ Inverted

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very graceful lines.

To prove that graceful lines do not always contribute to good flights, look at picture No. 11. Here you see a group, headed by Joe Mastrovitch, whose son won the Class B Senior Event. Two other members of his club, Bernard Jensen and Walter Kabena, are also shown with their ships. These planes will demand a lot of explaining from those builders who advocate streamlining, for, as you can see, they are built completely "on the square," with hardly a curved line in their entire structure. The ends were cut straight. Vertical end plates were used, both on the wing and on the stabilizer. The stabilizer plates served as fins. They were nothing short of remarkable fliers, and proved definitely that the most important point is correct aerodynamic design rather than merely streamlines. They were far from sluggish in flight and turned in beautiful glides.

The highlight of the whole meet was the announcing over the loud-speaker system by Carroll Moon. He "sprayed" the field with a continuous barrage of words from early morning until the closing of the contest, at 6 p.m. He commented, in a most interesting manner, on the types of ships, flights made and the various personalities who took part in the activities. They were tinged with a sense of humor which kept everyone in good spirits even during the rain-storm. Picture No. 12 shows him ready to make an announcement of some interesting maneuver which is being pointed out to him by Leon Shulman.

Because of the detailed announcements this was probably one of the most interesting contests ever held, from the standpoint of the spectators, who understood exactly what was going on during the entire period of the contest.

Armand Vanquez is noted for his planes of unusual and artistic design. He specializes in gull wings and at this contest he appeared with a gull-ship embodying a new feature, a retractable, one-wheel landing gear. In picture No. 13 you see him following it as it comes in from a flight with a flat glide.

Picture No. 14 shows a group of the winners with their trophies and one of the directors of the contest, Mr. Grant, editor of MODEL AIRPLANE NEWS, who is seated at the center in front of the sign. The winners, their times and prizes won are as follows:

Class A. Senior

Stanley Jaskot	1.50	Casey Jones Trophy—(rotative) 3 Flexo Propellers
George A. Neil	1.30-1/3	Denny Motor
Edward Osterling	1.23	Bay Ridge Trophy
W. B. Gillete	1.22-4/5	Wright Trophy
Louis Garami	1.21.1	Kit and 3 Flexo Propellers
John Dindra, Sr.	1.21	Two years subscription MODEL AIRPLANE NEWS
Sol Taibi	1.19	One year subscription *Flying Aces Magazine*

Class B. Senior

John Mastrovitch	3.46	Hobby Lobby Trophy—3 Flexo Propellers
Russell Simmons	2.05	Clock—1 Flexo
Vincent Bonnema	1.51-1/3	Brown "D" and Scientific Mercury
Fred Gross	1.51	"Newark Sunday Call" Trophy
Frank Lashik	1.46-2/3	Shereshaw Scientific Engine Kit and 2 Flexos
Elmer Grantzki	1.45	Two years subscription M. A. N.
Ray Hooey	1.36	One three bladed propeller

Class C. Senior

Russell Simmons	2.21.3	Scientific Trophy and Radio Control Unit
Alfred H. Conklin	2.15.5	Air Trails Wrist Watch
Clifford Simmons	2.14.8	Junior Motor Trophy and 3 bladed propeller
Frank Lashik	1.53.6	Trophy
Marcel E. Kubler	1.39.3	Kit—2 years subscription M. A. N.
Sidney Schreer	1.34	Two years subscription M. A. N.
W. Sobie	1.27.3	One three bladed propeller

Class A. Junior

Burroughs	2.7 - 1/3	Microdyne Engine Trophy and Flexo
James Ulmes	1.08.1	"Flying Aces" Trophy and Subscription
Edward Miliski	.45.1	Shereshaw's Scientific Mercury

Class B. Junior

Burroughs	2.7 - 1/3	Branford Theatre Trophy "Newark"
John Powell	2.0 - 1/3	Comet Clipper Kits

Class C. Junior

Michael La Torre	2.11.7	"Star Ledger" Trophy "Newark" and Flexo
Fred Ungrich	1.50	Shereshaw Scientific Mercury
Edward Miller	1.20.3	Flying Quaker Kits

Another type of contest which is gaining interest in the East is the gas model hydro. The annual "ducking," the Eastern Seaplane Contest, was held on the Manhasqaconk River, Breton Woods, N. J., on June 9th, from 10 a.m. to 6 p.m. It was sponsored by the Jersey Airsquares Club. There were about 50 entries, which

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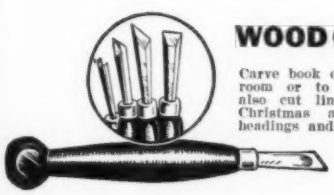

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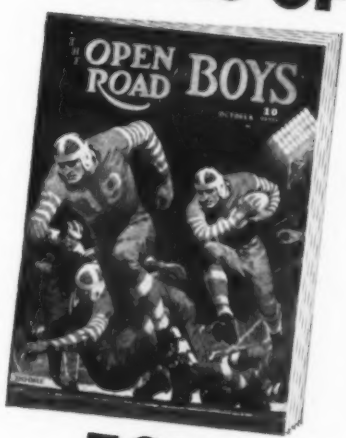

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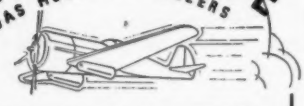

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is unusually large for this type of event. Though builders flew with greater success than at the last contest in 1939, there still was evidence that they had not completely solved the problem of float design. A number of the ships made excellent flights but in others the floats refused to leave the water. (Those interested in hydro models will find some valuable points in the article appearing in this issue entitled, "Seaplane Pointers.")

Three hydro records were established. They were made by:

	Average of 3 flights
Open, Class C. Geo. Gilchrest	31-2/3 sec.
Senior, Class C, Sol Taibi	45-1/5 sec.
Senior, Class B. Fred Gross	36-1/2 sec.

The Jersey Airsquares presented its large representation trophy to the Sky-Scrapers, one of the most active gas model clubs in the East, for having the most club members entered in the contest.

Sol "Duck" Taibi was the only contestant capable of making three official flights. The high flight of the day, 1 minute, 12 seconds, was made by Leon Shulman. Both are members of the Sky-Scrapers of Brooklyn, New York.

The following are the winners:

Class "C" R. O. W.

		Average of 3 flights
1.	Sol Taibi	45-1/5 sec.
2.	Leon Shulman	37-1/3 sec.
3.	Geo. Gilchrest	31-2/3 sec.
4.	Frank Lasluk	29 sec.
5.	R. J. Modessohn	23-1/3 sec.
6.	Daniel Patterson	14-2/5 sec.
7.	Joseph Mastrovitch	9 sec.
8.	Jerry Stoloff	8 sec.
9.	Thomas Murphy	6 sec.
10.	Fred Wolf, Jr.	4-1/3 sec.

Class "B" R. O. W.

1.	Fred Gross	36-1/2 sec.
2.	Elmer Granitz Ri	35-1/3 sec.
3.	Frank McElwee	23-1/3 sec.
4.	Donald Huff	21-2/3 sec.

Plans are under way for the 1941 seaplane meet and all indications show that it will be one of the largest seaplane meets ever held.

The winning ships were all of similar design and evidence of the excellent flying qualities of this model is shown in picture No. 18. Here you see it climbing off the water at a 45-degree angle.

Picture No. 15 shows Roger Smith with his Super-Buccaneer on floats: the largest ship at the contest. Note the shape of the bottom of the floats: The nose is turned up at rather a sharp angle while the end-planing surface is comparatively flat. Graceful curves do not produce the best results.

In Picture No. 16 you see a beautiful scale Fairchild Amphibian with a span of 5 feet, built by Frank Lashek. This ship, we understand, had trouble in getting off the water.

In picture No. 17 our old friend, Louis Garami, appears again. There is hardly a contest that Louis doesn't attend and he may be rated as one of the most persistent fans in the game.

In picture No. 19 you see one of the planes taking off, just clearing the water nicely.

Unfortunately something went wrong and it ended as you see in picture No. 20. This was taken at the exact moment the plane hit the water after a vertical dive.

California

R. E. Hulse of 310 Pellissier Bldg., Los Angeles, Calif., sends us the following report of a recent contest.

The Gas Model Airplane Association of Southern California staged their 8th semi-annual Contest at Los Angeles, Calif., on June 9, 1940, with outstanding successful results.

The meet was supervised by Iver Shoemaker, President of G. M. A. A. S. C., with many capable assistants including Frank Knapton, Field Chairman; Earl Harp and Harold Ball, Public Address Announcers; Leo Berry, Treasurer; Mrs. Leo Berry, Recorder; Andrew Petersen, Secretary; Mrs. Shoemaker, in charge of awards; Bill Lane, weights; the Avions, National Aeronautical Youth Group under the direction of Peyton Watkins, acted as timers; and many others who very efficiently handled 350 contestants during the day's activities. The organization work was excellent and the contest proceeded with clock like precision, which was greatly appreciated by both spectators and contestants.

Many early-birds came out at the crack of dawn, giving their ships and motors last-minute check-ups, and, although a high fog condition prevailed during the early morning hours, the weather was comparatively warm and promptly at 8 a.m. the first flights were under way. Due to the dead air condition early in the contest no outstanding times were made. However, about 10:30 a.m., when the sun began to break through light fog banks, the sky was literally filled with ships and anyone who might have been skeptical about Southern California's thermals will be interested to know that twenty ships were lost during the day and thirteen of these planes were never recovered.

Eight out of state entries included:

Fredrick Hinkle	Phoenix, Ariz.
Robert Hinkle	Phoenix, Ariz.
Joe Song	Stockdale, Ariz.
Bill Ham	Mesa, Ariz.
G. H. Webster	Phoenix, Ariz.
John Dallaire, Jr.	Medford, Ore.
Geo. Gilling	Medford, Ore.
V. C. Hill	Seattle, Wash.

The youngest contestant at the meet was Jimmie Snyder, son of Mr. and Mrs. Barney Snyder, who is eleven years old.

Dorothy Shepherd was victorious among the ladies and won a beautiful mirror when she made a flight of 2 min. 10.7 sec. with her Class A plane powered with an Atom motor.

The "Williams Family" stole the spotlight for the "Unusual Items" at the contest. Three generations were entered in the meet. J. J. Williams was the father and grandfather, Jim Williams was the son and father, and Jerry Williams, the son and grandson. (Boy! page "Believe it or Not" Ripley.)

Incidentally, Jim Williams won second place at the meet with his Class C, K.G. S. Bunch Tiger-powered ship.

(Continued on page 67)

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"Tail First" with Gas Power

(Continued from page 15)

MODEL IS TO BE KEPT FROM STALLING. That's the trouble the others ran into. They forgot that in a gas model pusher, the motor weight was concentrated to the rear and that the center of gravity would, consequently, be brought back over the main wing. That won't do.

So, you move the main wing back as far as it will go without getting wound up in the propeller, put on a long fuselage, and stick the batteries, coil, timer and everything else but the kitchen sink way up near the front wing, and, Voila!—there you are! It's simple, but annoying, if you haven't found it out.

So don't forget that in building this plane or in building some improvement of it—keep the center of gravity way up front. A good healthy forward landing gear helps a lot here, too.

Remember that this plane is an experimental model and while its success is really terrific, it can be improved upon. Streamlining, different aerofoils and all the rest can be tried. This is merely here to help you build your first successful "canard" and to accustom you to where the various weights and surfaces belong. We think that you fellows can take this design, as we intend to do, and fiddle around with it until you have an unbeatable plane in competition with tractors. I guess this makes us unique among model designers—the others usually caution against changes. But the credit is not ours—but rather this swell little plane. One of the things, by the way, that will please you most in this ship is its excellent glide; it glides like a pancake, yet never approaches a stall—seems to keep its nose down no matter what the speed—or lack of it.

You might, if you wish, give the ship a bit more rudder area. You see, with the rudders out of the slipstream of the prop, as they are here, they lose a lot of effect, as well as some more through interference on both sides of the wing, where mounted.

Now a word about the possibilities of shifting power plants and consequently weights, on this particular ship as regards the new rules.

The original plane weighed 24 ounces, giving a wing loading of ten and a half ounces per square foot, and was powered with an Ohlsson "23." The plane flew very well under this loading, which had the plane carrying five and a half ounces more than is required if this motor is used. Therefore it is easy to understand that this plane can easily handle a motor of similar displacement to the new Brownie "E," which requires that the plane weigh 23.30 ounces. If, however, you want to use the Ohlsson and want to better the model's performance, you may actually cut down your weight to about 19 ounces and still meet all requirements under the new rules. This will give the plane a loading of only a fraction more than eight ounces per square foot and should add to the climb and soaring qualities considerably. If, however, you decide to cut down the weight in order to take advantage of this possibility, cut it down TOWARDS THE REAR OF THE PLANE.

ALWAYS REMEMBER, WHEN BUILDING THIS TYPE OF SHIP, THAT THE IMPORTANT THING IS TO KEEP THE CENTER OF GRAVITY WELL FORWARD OF THE REAR WING—and this is the best way to do it.

But let's get on to the actual construction of this baby. As in most cases, we'd better start with the fuselage, which is simple and orthodox in construction.

Using some solid 3/16" square balsa, lay out duplicate sides of the fuselage, being careful to make both sides identical. One of the best ways to insure this is to build one side on the completed side of the other while still in the drying stage. When both sides are completely dry and checked for alignment, lift them from the table and join them together with 3/16" square cross-pieces as shown in the top elevation. Here again, alignment is most important.

The nose block, of solid balsa, and the rear block, of similar material, are then added to the frame, as well as the balsa incidence block for the front plane. Formers "H" to "Q" are then cut out of 1/16" sheet balsa and added to the bottom of the frame, after which stringers of 1/8" square are attached, completing the bottom of the fuselage. Formers "D" to "G" are then placed properly on the top of the fuselage, and stringers of 1/8" square added here, too. Formers "A" to "C" are placed on top of the fuselage ONLY WITH PINS, however, while stringers are properly added, for this section is removed later and hinged, to serve afterwards as entrance to the ignition system, which will be centered well forward.

At this point, 3/32" plywood bulkheads are cut out according to the drawings and attached as shown to be used as mounts for the landing gear. The forward landing gear is "U"-shaped to carry the single air-wheel used to keep the nose of the ship out of the dirt, while the rear landing gear is conventional to carry the usual two wheels there. 1/16" steel wire is used in both cases, firmly attached to the bulkhead by use of the "overlays" grooved to the depth of the wire struts. 2-5/8" airwheels are used throughout. 1/4" x 3/8" hardwood motor bearers are fastened sturdily to the insides of the top longerons. This virtually completes the fuselage except for the balsa piece which fits over the front plane to carry out the streamlining—which, of course, must wait, and the same is true of the balsa pieces which cover over the main wing to streamline to the rear of the fuselage. The "housing" or "pilot's enclosure" is necessary to make the fuselage cross-section legal. It is added later and can be made either permanent or detachable.

Shifting from the fuselage to the front plane, construction here is entirely conventional. The center or master rib is shown full-size on the plans and is an original airfoil found to be very successful. The other ribs are similar, though of course properly graded in size. The leading edge is of 1/4" by 5/16", shaped to suit the section. The top main spar is 1/8" by 5/16", HARD balsa, tapered down to 1/8" by 3/16" at the tip rib. The rear spar is 1/8" by 3/16" tapered to 1/8" square. Trailing edge is 1/2" by 1/8". The tips are 1/2" by 1/8" balsa, too, shaped after construction to suit. A steep 4" dihedral on each wing tip is employed here, and the center section planked with 1/32" sheet balsa to give it the necessary strength.

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Construction of the main or rear wing is virtually the same as that used in the front plane, though of course, on a larger scale. The ribs, in this case, are mounted on a leading edge of 1/4" by 3/8"; a main upper spar of 1/8" by 1/2" tapered to 1/8" by 1/4" at the tip rib; a rear spar of 3/16" by 5/16" tapered to 3/16" square; and a trailing edge of 3/4" by 1/4". Notice that the trailing edge of the wing at the center section is built with a cut-out, in order to allow simple rubber band mounting without interference from the motor—thus still allowing the trailing edge of the wing surface to be as far back as possible. The center section is planked with 1/16" sheet balsa for strength and don't forget the false ribs so as to be able to mount the rudders. Dihedral on this surface is 3" on each tip.

The rudders are simple to make—four are necessary—and are constructed of 3/32" balsa throughout. Covering of the ship is paper, and that job you all know how to do without instructions. Just remember that this ship, like all others, can do with a good covering job, both for performance's and appearance's sake.

About the only undesirable feature in the entire plane is the fact that, due to the ignition accessories being near the front of the ship, the ignition wires are necessarily long. This, of course, makes ignition trouble easier to occur, though not at all necessary. In other words, be particularly careful in your wiring (something that never hurts) and use medium-sized batteries, even if you are certain pen-cells will do. Do this both because of the added "juice" and also because it will help bring the center of gravity towards the nose. Use a good dependable timer, well mounted, and a sure-fire battery box. This, together with proper wiring, should guarantee you no motor difficulties.

After covering, be very careful in mounting the front plane, being certain your incidence angle is proper and that it is mounted level when sighted head-on. The same is true of the rear wing (except that NO incidence is used here). Ordinary rubber attachment is used in the rear surface and, although the original had the front plane permanently attached, it might not be a bad idea to mount this plane with rubber, too; at least until you are certain the prescribed incidence is proper for your particular ship, which may vary somewhat from the original. However, suit yourself on this—as you probably will do anyway. A good 11" prop was found to be perfectly suitable on the original, although, frankly, we had little chance to test it, losing it on its third flight.

You'll find the ship easy to fly, and easy to get off due to its three-wheel underpinning. It isn't upset easily on the take-off and unassisted take-offs are essential with this ship, unless you want your fingers chopped off! The climb is steep and steady and the glide flat and easy. She soars on the slightest implication and has a funny habit of fighting into the wind that's usually good for a few feet of altitude before she turns tail and runs before the breeze.

Go ahead and try this crate—you'll not be disappointed, we know, and it'll open new fields of possibility to you in the future. One fellow we know has already asked for a design of a twin-motored job like this one! Both MODEL AIRPLANE NEWS and the author will be interested in knowing how you made out with your "tail-first"—let us know about it, won't you?

The Vultee Vanguard Flying Miniature

(Continued from page 23)

cockpit. Cement half of the bulkheads to their respective positions and when dry remove from the plan and attach the remaining ones to the other side. Align the bulkheads accurately so they are exactly perpendicular to the keels. Cement the two 1/16" square stringers to each side where the notches are provided, being careful not to draw the fuselage out of line. Place the remaining stringers, cutting the notches as required with a sliver of a razor blade. Once a stringer is attached to one side, always place another in the corresponding position of the other side. After the stringers are all attached, the temporary brace at the cockpit as well as the portion of the bottom keel between section 2 and section 5 should be removed.

The engine cowl and top of the fuselage back to the cockpit are covered with 1/32" sheet. Make a paper pattern of the cockpit shape and cut the sheet balsa accordingly before cementing to place. Pins and rubber bands will help keep the sheeting in place until the cement is dry.

The cowl front is made from four discs of 1/8" thick balsa which are cemented together. The back disc, adjacent to bulkhead No. 1, is solid except for the 5/8" hole for the nose plug; other discs have the centers removed to the extent indicated on the plan. Cement together with the grain of each opposite that of the adjacent discs. Attach the unit to the first bulkhead and when dry, roughly cut to shape. Finish by sandpapering the cowl and sheet balsa covering. Details of the nose plug are indicated. The removable nose plug should be made to fit neatly to the crank case which is cemented within the cowl front.

Tail Surfaces

Construction of the tail surfaces is easy. Both the stabilizer and rudder are built in a similar manner. In the interest of greater strength the stabilizer is built in one piece. Outlines are cut from 1/16" sheet and the ribs and spars are 1/16" square strips. When dry, the frames are removed from the plan and very soft pieces of 1/16" square cemented to both sides of the ribs. These are cut to a streamline shape when the adhesive has hardened. Trim and sandpaper the surfaces to the final shape. Surfaces constructed in this manner are light yet sturdy.

Wing

It is necessary for the wing to be of strong construction since the landing gear is attached to it. Make a left wing plan so both halves of the wing can be assembled directly over full-size plans. Ribs W1 to W4 are cut from medium grade 1/16" sheet while W5 to W8 are 1/32" sheet. Pin the ribs to place over the plan and attach the spars and leading and trailing edges; however, the spar to which the landing gear struts are attached is not placed in position until the dihedral has been added. Cen-

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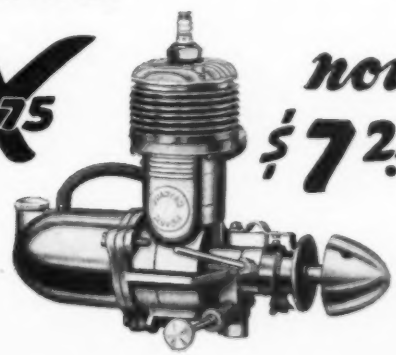

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ter ribs W1 should be slanted to the dihedral will be correct when the wings are joined. Tips are cut from 3/32" sheet. Join the wings solidly using plenty of cement; dihedral should be 2 1/16" at each tip. Attach the 1/16" x 3/16" hard balsa spar and reenforce the joint necessitated by the dihedral. Trim and sandpaper the entire wing.

Landing Gear

A landing gear of the type used on the "Vanguard" always presents a problem to the model maker. However, the landing gear developed for this model is easy to make, accurate in appearance and it will take all the abuse the model can give. .040 music wire is used and the top is bent in such a manner as to join the lower wing spars and rib No. 4. Make a right and left strut. With thread bind the struts to the spars and then use a needle and sew right through rib No. 4 and about the wire. Apply several coats of cement to the thread wrappings and adjacent areas. The rubber tubing covers are not slipped on until the wing has been covered.

Wheels may be purchased or they can be made from laminations of 1/8" thick balsa. Cement washers to both sides of each wheel so they will turn freely and accurately.

Propeller

Select a very hard balsa block 1" x 1 5/8" x 8 1/2" for the propeller. Drill the tiny hole for the prop shaft and then cut out the blank as indicated on the plan. Carve a right hand prop. Finish the back surface of the blades first, then cut away the front until the blade thickness is as desired. Reduce the thickness of the hub and round the tops of the blades in a manner similar to the prop in the photos. Sand to a final, smooth shape. Apply several coats of clear dope with light sanding between each. Cement washers to both sides of the prop shaft hole and then apply color dope.

The prop shaft is bent from .040 music wire. Slip the nose plug which was made previously, and propeller, in place with several washers between them. If a free-wheel device is to be used, the end of the shaft is bent as indicated; otherwise the end of the shaft is bent at a right angle and forced into the hub. The loop at the front of the shaft serves as a place to hook a mechanical winder.

Covering

First step in preparing for a fine covering job is to thoroughly sand every bit of the frame work to remove all flaws and roughness. Since only those members of the fuselage which run from nose to tail should touch the covering, it is necessary to sand the bulkheads to a scalloped shape. This is done with a piece of fine sandpaper wrapped about a pencil or similar round object.

Colored tissue is used for all of the covering and decorations. Red and black with blue and yellow trim is the color of the plane shown in the photographs. Cover the wing first, using banana oil or light dope to stick the tissue to the frames. Wings are covered from the second rib to the tips. Attach only the extremities of the area being covered. Tips require separate pieces to help avoid wrinkles. Tail surfaces are covered in the same manner. Since the fuselage is circular in cross-section, it is necessary to use many small pieces of tissue to help prevent unsightly wrinkles. The cowl and other sheet-balsa-covered parts are tissue covered, too. Spray the covering with water and pin the surfaces to a level position to keep them from warping. The clear dope is NOT applied to the covering until later.

Assembly

Following is the recommended procedure for assembling the Vanguard: Cement the wing to the position indicated on the plan; if the structure has been reproduced accurately, the angle of incidence will automatically be correct. Finish the under section from wing to fuselage with pieces of 1/16" square. Wing root pieces are cut from 1/16" sheet and they are cemented between the wing and fuselage. The 1/32" sheet fillet pieces are shown on the plan. This pattern indicates the shape of the fillets on the original model but most models will vary somewhat so paper patterns should be made to fit your model exactly before the sheet balsa ones are cut. Once the fillets are cemented to position, the several small openings at the junction of the wing and body should be "filled-in" with scraps of soft 1/16" sheet. Sand smooth and cover the fillets with colored tissue. To set the stabilizer in position it will be necessary to temporarily cut the rear of the fuselage and bulkhead No. 9; attaching the stabilizer at a slight negative angle. The rudder is attached exactly perpendicular to the stabilizer, and it is off-set 1/16" to counter-act torque. Small tissue fillets at the tail surfaces will enhance the model's appearance. Moisten any wrinkles and permit to dry before applying a coat of clear dope to the entire model.

Addition of the various minor details completes the construction. The cockpit enclosure is made from thin sheet celluloid. Make accurate patterns before cutting the celluloid; avoid cement smears when cementing to place. Slip the rubber tubing (as used on electrical appliances, etc.) on the wire struts. Wheels are held to the axles by washers soldered to place. The wheel covers are cut from 1/32" sheet or stiff paper; they should be covered with colored tissue to match the other parts. Seven base-relief cylinders are cemented within the cowl to represent the twin-row Wasp. Color the cylinders and cowl front black. Control surface outlines are black tissue strips, as are the cowl flaps. The Swedish insignia on the original model was made with black tissue, too. A tail wheel and other details found on photos of the real ship can be incorporated to make your Vanguard more attractive.

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rubber. Hook the motor to the prop shaft and drop the other end through the fuselage. It may be necessary to remove a small portion of the covering in order to get the strands in position to be held by the removable bamboo pin. The model Vanguard is now ready for its initial flights.

Flying

Select a calm day and a grassy field for the first tests. First, try a few hand glides to ascertain the correct balance; a small weight in the nose or tail will correct a tendency to stall or glide too steeply. Once the balance seems right, wind the motor a few turns and launch. The flight should be smooth without a tendency to bank excessively. Tilt the nose plug right or left to control the circle; a bit of down-thrust will remedy a stall while under power. Gradually increase the number of turns and make any further adjustments. Stretch the rubber and store up power with a mechanical winder for maximum flights.

The author's ship was thoroughly tested and proved to be a good flyer. It is, however, sensitive to every adjustment so any change must be made with skill and care.

Seaplane Pointers

(Continued from page 14)

used, soda straws, aluminum tubing or two bulkheads placed close together make excellent air vents. If the second method is used, a concave or hollow "V" under-surface must be used in constructing the forward portion of the float.

In locating the step in relation to the airplane, the best position is slightly to the rear of a vertical line drawn through the center-of-gravity of the plane. A good rule to follow is: Place the step at a point directly under the center point of the average chord of the wing if the wing is cantilever or elliptical; or under the center point of the wing chord if the wing is straight.

Unsuccessful and Successful Types

To successfully build an efficient model seaplane float, a designer must know those types and profiles which will be unsuccessful and those which will be successful. In addition, he must also know why they are as they are. In considering "suction effect" and "step action" on the floats, the cross-section, side profile and top profile must all be taken into account. In order to study the effect of various shapes, proportions and curves on the action of a seaplane, each profile is illustrated separately for individual study of its good and bad points. The good points, in each, are underlined.

Fig. 5 shows the characteristics, both good and bad, of a number of popular cross-sectional views. In Fig. 6 several side profile views are illustrated with their good and bad points. In Fig. 7 several top profiles of conventional design are represented. Notice that successful types generally possess few convex curves; whereas faulty types have, as a rule, curved profiles somewhere in their design. In selecting a successful design for a gas model, select a combination of these three profiles offering best results together with convenience, ease of handling and building.

Before selecting the type of float to construct, first consider the type of airplane to which it is to be adapted. Is the model one of the conventional type to which floats interchangeable with wheels are to be adapted? Or is it to be a completely new design—a flying boat, an amphibian, or, perhaps, a scale model of a naval single-float scouting plane? In either case, the dimensions and proportions will vary with the type of airplane.

Roughly, seaplanes are divided into the following types:

(1) Twin-float designs (usually adaptable to wheeled types).
(2) Triple-float designs.
(3) Single-float airplane with auxiliary wing floats for stability.
(4) Flying boats with wing floats.
(5) Flying boats with sponsons.
(6) Amphibians.

In the last three types, the floats must be designed as an integral part of the airplane, unless the ingenuity of the designer can overcome this obstacle. In the first three types, the floats must be designed separately and easily adapted to interchangeability with wheels on conventional types. Interchangeability with floats is a desirable feature possessed by all models now on the market in kit form.

Twin-Float Designs

Fig. 8 is a conventional model designed in the summer of 1938 at the Air Corps Technical School, Chanute Field, Illinois.

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The landing gear was the single-strut, piano wire type used on the popular Comet "Clipper." The two floats were designed separately in an integral unit with piano wire clips to fasten onto the landing gear struts. A rear strut of piano wire was built solidly into the floats, fastening on the bottom of the fuselage by simple wire clips. Although never actually constructed, the model illustrates one simple method of providing interchangeable floats on any gas model.

Fig. 9 is the complete development, over a period of more than a year, of the basic idea in Fig. 8. To offset torque, always undesirable in a twin-float seaplane, an extension shaft is provided to the front propeller; a second propeller being placed immediately behind the first revolving in the opposite direction by a friction and ball-bearing device. This device is being constructed by Leo Pasco, an expert machinist and a graduate of the Air Corps Technical School Machinists' School.

Torque effects on twin-float designs are great and will cause undesirable water take-offs if care is not taken in designing and flying the airplane. Before reaching get-away speed, one float—the left float with counter-clockwise propellers—will be forced downward, causing the airplane to swing to the left. The right float will be the first to disengage itself from the water, causing the airplane to circle on the take-off and launch itself in the opposite direction in a steeply banked curve. In a gas model, because of the high RPM of the motor, this torque effect is less than in rubber-powered models. Nevertheless, the effects may be more disastrous because of the high rate of speed at which the gas model flies. In both types, careful design will correct the torque fault. For instance, the left float may be made a little broader in beam, or the right float a little longer; the right float may be built with a smaller step or designed with a slight curve on the bottom of the float to the rear of the step; or the floats may be matched in design but not in weight; or they may be offset on the model, etc. Several expedients to overcome the torque fault will present themselves to the ingenious designer. The double revolving propeller in Fig. 9 is only one method which might present itself.

In proportion, twin floats should be long and narrow; with a length not less than one-half the length of the fuselage from tip to tail and not greater than the overall length of the fuselage. In most cases, a pair of floats, each equal in length to one-half the total wing span, will give excellent results. The maximum beam, or width, of the floats should be between one-eighth and one-fifth the length, inclusive. For a heavy model or a weight-carrying model, a wide beam should be used; for a light-weight model, a narrow beam is sufficient. In either case, the smallest beam necessary for good take-off and flight should be chosen. The overall height of the floats should be from one-half to three-quarters the maximum beam. The suggested dimensions for twin floats on a four-foot wingspan model would be: Length—24 inches, maximum beam—4 inches, maximum height overall—3 inches.

Twin-float types are the trickiest of all seaplane types to build and fly. Single-float and flying boat types are less difficult to design, easier to build, and will render better results in take-off and landing than do the twin-float types.

Single-Float Designs

Single-float designs offer the surest bet to model builders who wish to creat and build a successful model seaplane. Combined with wing-tip floats, "outrigger" auxiliary floats, or sponsons, a single-float model will nearly always prove successful.

Single-float seaplanes are usually distinguished from the so-called flying boat types by their comparatively long length, narrow beam, and dimensions. For instance, the model shown in Fig. 10, without the wheels, would be a single-float seaplane rather than a flying-boat. The model illustrated has been built to scale in rubber-powered form and has proved very efficient, both in take-off and in flight.

Fig. 11A and 11B illustrate other possible variations of the single-float idea. Gas model scale adaptions of such single-float airplanes as the Vought-Sikorsky Scout Bomber and the Grumman Amphibian Biplane should be entirely possible. The floats on these airplanes have been excellently designed and there is no reason why good flights should not be obtained from corresponding models built to scale. The seaplanes designed by Frank Tinsley for the "Bill Barnes" series of stories should make excellent single-float gas models possessing both beauty and performance.

The characteristics of the single-float type are as follows: medium length of float with medium or narrow beam, coupled with small auxiliary floats or sponsons. Single floats may retain the same characteristics as the twin floats, or they can be considerably shortened in length without affecting their efficiency.

Wing Floats and Sponsons

If a single-float type of seaplane or a flying boat is constructed, some means must be provided to insure level flotation and steady planing. In some cases, the design of the airplane and float may be such that auxiliary devices such as wing-tip floats or sponsons are unnecessary. If the designer can build and successfully fly a seaplane without auxiliary floats, he should feel rightfully proud, for the elimination of weight and parasitic resistance will materially increase the performance of his plane.

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In most cases, however, the addition of auxiliary getaway devices will be necessary to insure quick take-offs and level landings. Fig. 12 sketches a few conventional designs for auxiliary floats. Whatever type of design is chosen, a few main points must be kept in mind:

With the plane on a level keel on the water, the axis of the float or sponson should be inclined at a fairly large angle to the surface of the water, usually between ten and twenty degrees. The lowest point of the trailing edge of the wing float should be just below the level of the chine of the main float. At rest, the point of contact with the water should be slightly to the rear of the main step of the central float.

By placing the auxiliary floats to the rear of a lateral line through the main step, pressure on movement will be exerted on the rear of the float, causing the airplane to quickly assume the "getaway" or planing position. See Fig. 1.

The choice between the use of floats or sponsons is purely arbitrary, depending on the personal preference of the designer. Sponsons can be more strongly constructed, while floats seem to have better planing and geataway characteristics in a take-off. In either case, the size and weight of auxiliary floats should be kept to a minimum consistent with necessary strength.

Triple-Float Designs

Until about 1932, a very popular floatation device on scouting airplanes carried by the British Navy was the triple-float, consisting of two short floats forward and a tail float aft. The earliest form of float used on pre-World-War-No.-1 airplanes, the triple float is very efficient on lightweight, low-powered, slow-moving airplanes. It floats well, planes well, assumes a getaway angle rapidly, has little resistance to either water or air and is light in weight. On man-carrying airplanes, the triple float has the disadvantages of being difficult to taxi, hard to handle on the water and unwieldly to catapult. It also possesses too much air resistance when compared to other types. On models, however, it is an ideal arrangement and will always give excellent results even when improperly designed and constructed.

The two main forward floats should be placed ahead of the center of gravity at an angle of about five degrees to the line of thrust. The rear float may be constructed very small—less than one half the volume of the main floats—and very light and may be fastened to the tailskid at an agle of from ten to twenty degrees to the line of thrust. Struts should be so proportioned that the line of thrust of the plane at rest is inclined to the surface of the water at an angle of four degrees. This initial angle of attack will enable the plane to quickly assume the getaway position.

With this brief discussion of triple-float design, this very general discussion of model float design is brought to a close. No attempt has been made to present mathematical formulae for design, for the author feels that an introduction to the general aspects is first essential to a clear understanding of the subject.

For those who feel that this article has been too broad and too general, an attempt will be made in later discussions to present more specialized aspects of model seaplane design. For instance, future articles will deal with the following subjects:

(1) The Analytics of Model Seaplane Design.

(2) The Construction of Model Seaplane Floats.

(3) Plans and Drawings for the Construction of a Weight-Carrying Gas Model Seaplane.

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Wings of the Nationals

(Continued from page 20)

One of the biggest thrills of the meet, for the spectators, was the moment that Ben Shereshaw's radio job dove in from a great height. Apparently the builder tried, without avail, to pull the ship out of the dive but due to lack of response to the operating lever on the ground, the ship dove straight for earth and broke into an infinite number of pieces. It is probable that the air pressures on the control surfaces, due to the high rate of speed in the dive, were so great that the operating mechanism in the plane was not sufficient to move the controls against them.

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City.....State.....

It is a Class C ship built by Dean Berry. This little plane made flight after flight in a most consistent manner and, what is more remarkable, these flights compared in quality and duration with those made by the monoplane type of contest model.

It had several interesting features: The two wings were not attached together but each was connected individually to the fuselage of the ship. The top wing rested on longitudinal stringers and was held on by rubber bands in the usual manner. The lower wing fitted up into the fuselage. Very little dihedral was used and its performance proved conclusively that large dihedral is not necessary for complete stability when all design factors of these ships are arranged properly.

A number of interesting scale models were seen. In picture No. 5 you see Bill Hammer of Milwaukee with a Rearwin scale job of 29 inches span. The flights of these little ships have been increased considerably not only by the light structure but because of the practice of using a large, high-pitch prop, like the one in the picture.

One of the interesting new gadgets used in fuselage models is retractable landing gears. In picture No. 6 Jack Thames of Pittsburgh is shown with his Moffett fuselage job of 42 inches span, with the wheel of his landing gear tucked neatly away in the under side of the body. This landing gear consists merely of one straight, light wheel. As long as the ship is rested on the ground it is held in the down position, however as soon as the ship rises and the pressure on the wheel is released, a rubber band swings the gear back into the position shown.

Picture No. 7 shows Ervin Lashner giving his indoor fuselage job a little boost. He makes his own thermals by pushing up the air underneath one wing of his ship to bring it back in place. Indoor planes may be directed easily in their course in this manner. Inasmuch as this contributes to the flight capacity of the ship, we wonder whether or not there shouldn't be something in the rules concerning this matter. (Apparently those rule makers do nothing but make a model builder's life miserable!)

Charles Werle came "whirling in" from the West Coast with the indoor fuselage job which he is shown with in picture No. 8. Apparently the West and East has scrapped its differences of opinion and has finally gotten together for Abe Adler from the East Coast is doing his best to control the cranky motor.

When you look at picture No. 9 don't let it fool you. Joe E. Brown has not become a model builder; in fact this fan is no relation to him, in spite of the resemblance. We are sorry we are unable to give you his name; possibly he will write to us and enlighten us in this matter. He is shown holding another Moffett job with a retractable landing gear. This, however, had the added feature of twin rudders. This type of tail surface has proved most successful and makes models exceptionally steady in flight. The wing span is 36 inches and the length 34.

Philip Sonheim displayed a radio job which was a thing of beauty. Here, in picture No. 10, you see him tuning it up. It was beautifully constructed along the lines of the "Dolphin." Unfortunately however the model spun in, which maneuver the operator at the ground controls unsuccessfully tried to prevent.

A lesson can be learned from the results of the various radio craft displayed. In nearly every case the models that flew best were those with high or parasol wings. Ships with wings placed close to the C.G. invariably showed signs of instability or of being critical in their maneuvers.

Picture No. 11 shows a very interesting ship embodying a number of unique features. The gull wing gave stability with little loss of efficiency. C. A. Kukovich, its designer, made use of data obtained from recent wind tunnel tests which showed that bulb fuselages fly with much less resistance than those of orthodox design. The builder, with the help of a friend, is making good use of another idea which he incorporated in the model; namely, a removable tail and nose plug for winding, the plane "rides" the rudder while the motor is being mounted.

The Rearwin planes appeared to be extremely popular among many scale model builders as a prototype. Here in picture No. 12 you see another flying scale Rearwin displayed by its builder, John Chizmodia of Detroit. The general proportions of the large plane lend themselves to the creation of a stable and efficient scale model. Chizmodia's ship was an excellent piece of work and flew beautifully. It boasted of a folding propeller which added considerably to the glide. The ship had a span of 32 inches and a length of 24.

John Tudor, shown in picture No. 13, believes in "building 'em high." Believing in high parasol wings but fancying the performance of Cahill's 1938 Wakefield winner, he decided to combine the two features. So he produced the plane shown in the picture, in which you will recognize the Cahill fuselage and tail surfaces. The ship flew exceptionally well, having a flat, floating glide.

Many means were used to obtain flying efficiency in the Moffet class. Picture No. 14 shows Bob Hoffman of Sioux City with his plane, which gives evidence of such an effort. This is a very interesting ship; it has a very free-wheeling one-bladed prop, which type is known to be very efficient, and he has lowered the bell of the fuselage in a "V" so that it gives stability without excessive head resistance. This feature also allows the landing gear to be shortened to produce less parasite resistance. The wing is of tapered, high-aspect ratio, providing a low span loading. This enhances the climb and glide. The efficiency of the tail has been held to a maximum of tapering and a high aspect ratio. To top all of this, longitudinal stability has been aided by the parasol wing. Taken all in all, this is an exceptional ship and put up a fine showing.

In picture No. 15 you see another Moffett job with an unusually high aspect ratio. This is a trend in the right direction, for the higher the aspect ratio up to ten or twelve, the better the climb and glide that will be obtained by the model. The soaring qualities of any plane are increased tremendously with this type of wing. Max Wassem of New Philadelphia, Ohio, is the builder of this model.

Leo Bailey, winner of events in past contests, was on hand again to fly his scale model Cessna, which he is shown holding in picture No. 16. This was a beautifully constructed job, though, due to the type of ship, did not show the stability of some of the other models.

In picture No. 17 you see one of the most interesting scale models at the contest. It is a Feisler Storch shown with its builder,

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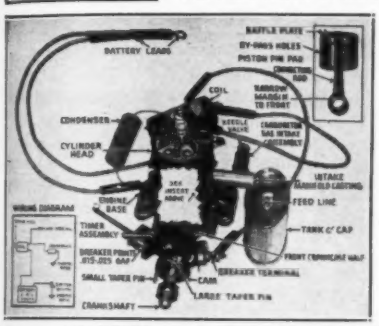

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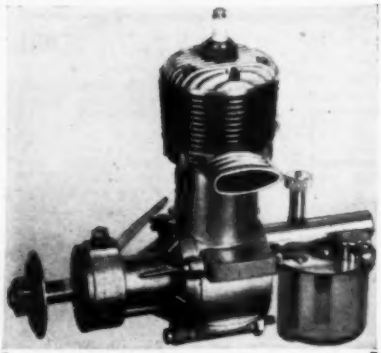

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In picture No. 18 Elmer Wassman is shown "bringing home the pieces," the result of the crash of his radio job. One would think that a radio job would never crash. It has two advantages: first of all, if the ship is as stable as a normal gas model it should fly like any other plane of that type, without a crack-up, and second, if it shows instability one should be able to correct the condition by manipulation of the controls by radio.

Picture No. 19 shows another of the more interesting planes at the meet. It is a Moffett type being held by its builder, Carroll Krupp, while his helper is doing the "winding act." Krupp has made the job of winding easier by the use of a folding tail. You will note how the rear part of the fuselage is folded together so that the rubber may be stretched for winding. When the motor is wound it is hooked to the rear fuselage section, which then folds into place and is held by rubber bands.

In picture No. 20 Bill Brown of Akron is shown holding his flying Pientenpol Aircamper. We will let you guess whether it is a rubber or a gas model. Judging from the propeller, we would say it is a gas job. However, the engine appears to be a dummy one which suggests rubber power. Possibly Brown is using a multiple-cylinder inline engine. We would appreciate it if he would write and tell us something about his ship, which is a beautiful little plane and the general design lends itself to flying scale models as it embraces the parasol type of wing and convenient fuselage proportions.

Many other unique planes were on display for the five days of the great national event and we regret that limited space prevents us from giving you a glimpse of all of them. Perhaps the best way to see what Model America is doing is to take the trip to the Nationals in 1941!

Mars Molds the Airplane

(Continued from page 9)

lini, have made it possible for the American designer, as we have said before, to use his creative genius to the fullest extent. It would take much more space than we have here to foretell the ultra-varied achievements in aircraft and engine design that may be accomplished, but we will bring you the details piece by piece in forthcoming articles and here we will bring you many facts that designers have already learned about military aircraft from the "big noise" now underway in Europe.

First of all, we are wondering what will happen to the observation plane. The French discovered that they did not need observation planes to find out where the Germans were located. By the time the observer had taken photos of the enemy location, had them developed and turned over to his general, the Germans were downstairs ransacking the general's favorite wine cellar. We wonder if that is why the U.S. Army Air Corps recently cancelled certain orders for high altitude twin-engined reconnaisance experimental planes.

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MODEL AIRPLANE NEWS

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The only airplanes now a-building in this country that might dare to get close to anti-aircraft guns are those high-wing ships being built by Curtiss. It is our guess though, IF we get into the scrap, that the Curtisses will be right alongside all the Stinsons, Ryans and Bellancas behind the lines telling the troops where to place their left foot and then their right foot. We think the main trouble with the French was that it was not a case of knowing where the Germans were, but where their own men were. The type of observation plane that is now needed for a good military force is not one that can go and find out where Munich, Kiel and Berlin are located, but one that can accompany the troops and inform them how the situation is just ahead and just where to hurriedly set up a defensive stand against a swiftly maneuvering enemy. The trouble with the French and English was that those gosh-awful German tanks moved so swiftly that the men did not know whether they were going to be attacked from front, rear or either side. If they had had slow-moving observation planes that could hover in the near vicinity and inform them when to attack and when to fall back, the Allies would not have been in the plight they are in today. The engineer's importance in this instance is to understand these tactics in order that he may design his airplanes accordingly. Germany has used the observation plane in such methods in her attacks, and it may be pointed out that the U.S. Army Air Corps also changed her policies toward this end even before the war started. There have been no repeat orders for the North American O-47B, the only high-performance observation plane in the Air Corps. As a matter of record the air corps has one O-47C with an enlarged observer's pit, and do not tell anybody, but those that had anything to do with the plane nicknamed it the "pot-bellied observation."

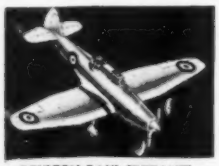
Canada, in a desperate need for small planes to accompany troops, has purchased several dozen Stinson "105" sportplanes from private owners in this country. The U.S. Army Air Corps, which would also like to obtain some in a big hurry, might order some North American NA-35 trainers to fill their needs. These airplanes may be built faster than any other plane on the market today . . . barring the claims of Henry Ford.

The opposition of the enemy seems to be too keen for an observation plane to go surging into enemy territory, and if such remote flights are necessary for some reason or other it should become the bomber's

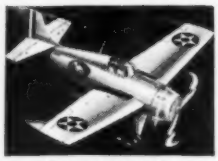
12 New Military Models by GUILLOW *of*

Planes that are making Air History

Fighters—Interceptors—Trainers—Pursuits—Scouts


BOULTON PAUL "DEFIANT"

CURTISS INTERCEPTOR-FIGHTER

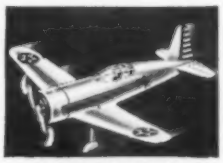

GRUMMAN F4F-3

HAWKER HURRICANE

NORTH AMERICAN TRAINER

FAIRCHILD PRIMARY TRAINER

BELL PURSUIT P-39


VULTEE VANGUARD 48

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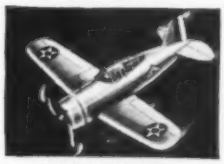
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PAUL K. GUILLOW Wakefield, Mass.

duty to perform the mission. This fact is kept in mind in the design of new bombers for the installation of reconnaissance equipment when necessary. Again the Germans have used this method in exploiting their hard-pressed enemy. All in all the militarists have had many years in which to find out the vital points of a nation without sending out observation planes to draw a map that Rand-McNally already has on hand. Thus, what is needed in the modern observation plane is more radio equipment and less cameras.

Another phase of military aviation that the engineer must look into is the multi-engined trainer business. A startling fact is that the U.S. Army Air Corps does not have a twin-engined plane expressly built for training. Practically every Douglas B-18 bomber is no longer a bomber, but a training plane. This appears to be a very de-luxe method of teaching embryo bomber-pilots. The air corps has given this predicament thought on many occasions, but none of the results were in the favor of the manufacturer who had a yen to build twin-engined trainers. Now that American youth is about to fly bombers at "play time" it appears to be an absolute necessity that a light, twin-engined plane be developed in order that he will not have to jump from an AT-6 into a red-hot, cloud blistering B-25! We hear that Vega has been working on a ship along those lines, no, not unit-twin powerplant. Something of around 200 hp. engines might do the trick. Bennett Aircraft in Texas is also looking toward any developments in this direction, with that plywood job of theirs.

A trainer of this type is not only of importance in teaching the pilot how to fly and maneuver a twin-engined airplane under all conditions, and in war you can get in some of the darndest predicaments, but facilities must be designed into the airplane for instructing gunners how to shoot . . . and again gunners must go through some of the darndest contortions in the sardine-can gun pits! Facilities should also be made for instructing navigation and radio operation and the operations at high altitude. It appears that the first one out with a good twin-engined training plane is going to be the very lucky person. That looks like good meat for a company like Beech who is, incidentally, now enlarging its plant. The design of such an airplane is by no means a simple problem as it may appear at first glance, and it would be most interesting indeed to see what sort of specification the U.S. Air Corps draws up for such an acquisition to its expansion program. We say it will be a plane with a total of 400-500 horsepower; what does the army say? We wish we could get more details from Europe on how much perspiration eminated from a Frenchman on his first flight in one of our Martins or Douglasses (Twin-engined light bombers) after graduating from flight training. A considerable amount of the training of French pilots was done in Africa in NA-57 and NA-64 airplanes. And, while on the subject of trainers, we might add that the English, in spite of their present predicament are not going about the training of

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1/16x⅛	20c
1/16x3/16	25c
1/16x¼	27c
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⅛x⅛	30c
⅛x3/16	50c
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7" 30c 8" 35c
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their pilots in any hurried, slip-shod manner, and those many NA-66 trainers now being delivered into Canada are of the very best quality. Large heating systems are installed in the cockpits to make the pilots comfortable in the cold climate, and the equipment is so up-to-date that the pilot is able to get the very best of training, in the least possible time and without going through a hectic ordeal in doing thus. If Great Britain can get these new pilots into the war soon, she has a good chance of turning the tables on the enemy. Again we have the American aeronautical engineer to thank for his creative genius.

The war has also taught us that the military cargo transport is a very important item. Few people in the United States know that we have the greatest military air transport system in the world today, yes, even better than Germany with her parachute troops. Army cargo planes, mostly Douglasses, carry on operations as intense as our airline traffic. They ply between the aircraft manufacturers and deliver spare parts made by them to the various air depots throughout the country. In case of war our many commercial airlines, would fit perfectly into the system. Some time ago there was talk that transports could be developed into bombers in times of war, but now it appears as this argument is settled. Times and circumstances have so changed that it is not necessary for them to turn into bombers to join the army, but they will be sorely needed to just remain as cargo carriers and transport armament, men and ammunition to fighting positions as needed.

Benny Howard is still reported to be at work on his tank carrier, and Charlie Babb is also forging ahead with a new cargo ship.

The main portion of the war in the air consists of pursuits and bombers, but they are another long story in themselves and we will postpone the discourse on them, as we have some off-the-cuff items here that we would like to get off our chest.

A couple of years ago we spent considerable space on predicting 2,000 hp. engines, and by gosh it came true! In these days the big fad is still PROGRESS, and people and things talk of 3,600 hp. engines! The details have been jumping around so much that we will just list them as we caught them on the first bounce and you can draw your own conclusions. Wrap a cold towel around your head; here we go. If we are not mistaken, we were the first to dare mention in this series over a year ago that Wright was preparing a 3,200 hp. powerplant to serve on the world. It sounded like it would be, perhaps, of the three-row radial type. Then "Flash News" said Wright also has a 3200 hp. engine of 32 cylinders of the flat-opposed type, 16 in each bank, plus two turbo-superchargers, for in-a-wing installation. Another Wright project is said to be a 42-cylinder liquid-cooled engine that will deliver upwards of 4,000 hp, and may reach 6,000 hp. for take-off.

Now, my good fellow, these engines are not intended for little interceptor pursuits . . . we hope. They will be very effective on giant transocean flyingboats. When one considers the horsepower of an ocean liner, 6000 hp. is no stretch of the imagination. Pratt & Whitney is going right up the line with 1800, 2000, 2300, 2400, 3200, 3600 and 4000 hp. power plants. Things seem to slow up at the 4,000 mark with probably an H type engine of four banks of eight cylinders each. Rumania, who is in anything but a position to be thinking of "world markets" gave birth to a large twin-row radial engine of 1,000 hp. midst all the confusion over there. It is produced by Rumania's one big engine plant, the I.A.R. Just what shell hole the engine is now buried in we do not know, but the plans of it will sure made good kite material for the kiddies in Berlin. Allison's 24-cylinder engine is back in seclusion again as the company does hand springs trying to get their 1,000 hp. engine into circulation. Lycoming's new 12-cylinder flat type engine certainly looks good.

And Douglas's new DC-6 will be a twin-engined transport with 2,000 hp. engines and carrying about 30 passengers. Lycoming started something when they brought out their flat type 1,200 hp. engine, and the tendency will be towards "flatter" appearing airplanes with diminishing fuselages and more useful load put in the wing. This pancake style will go a long way towards increasing speeds and may possibly simplify production. Jack Northrop says he has a basic design that he will follow in the planning of his new single and multi-engined military planes. From present predictions this basic design will be of a radical nature and a man-carrying flying test model of the first of this series is said to already be secretly under test on Muroc

PLANE

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3/4x11/4x10 2—5c
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3-1.25—3 1/2-1.50
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1 3/4, 2, 2 1/4—60c
Gas. Mod. 2 1/2—90c
3 1/2 1.50, 3 1/2 2.75
4 1/2 2.75—6" 4.00

PROPELLERS

Balsa	Paulo Ritz Wina	Gas Mod.
5" 4c- 7c		
6" 5c- 9c	8" 35c	
7" 6c-12c	9" 35c	
8" 7c-15c	10" 35c	
9" 8c-19c	11" 35c	
10" 9c-23c	12" 35c	
12" 10c-28c	13" 35c	
14" 12c-40c	14" 35c	
15" 15c-50c	15" 15X	
16" 16c-X	16" 50c	
18" 25c-X	18" $1	

RITZ Unfinished

8"-9"-10"-11" 15c
12"-13"-14" .15c
15"-16" 35c
17"-18" 50c

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Toggle Switch 50c val.....25c
"3 to 1" SAE 70 oil—1/2 pt.....25c
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3/32, 1/8	.7c...10c
3/16 1/4	.9c...12c

Sheet Alum.—ft.

.003 10c .010 15c

ALUM. LEAF

3 sheets.....5c

Dural Angle

1/4x1/2 .....15c ft.
3/4x1/8 .....22c ft.

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Prop Shafts, doz sm. 6c, large....10c
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Nose Plugs for 8c; 1/2"—8, 3/4"—6, 1" 4.

MUSIC WIRE finest quality

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.020 .028	6 ft. 3c
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.049	6 ft. 8c
1/16"	3 ft. 5c
3/32"	5 ft. 15c
1/8"	5 ft. 20c

WHEELS per pr.

Bush	Bisa Celu	A L U
1/8 .01	.03	
3/8 .02	.04	.05 M.
1 .03	.05	.07 .08
1 1/8 .04	.07	.10 .09
1 1/4 .06	.10	.16 .12
2 1/2	.12	
3	.15	.30

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Dry Lake. It is a twin-engined plane, perhaps of the attack-bomber type.

The new Manta Aircraft Co., whose executive roster includes David R. Davis of Davis airfoil fame, is developing a new fighter of the flying-wing type "knee deep" in heavy armament. Activities of this company have been unusually secretive and it is one company that promises to make a name for itself. It has a good foundation and comprises officials who have had extensive experience in the industry. In all likeliness the Davis airfoil will be incorporated in the design and it will be interesting to see how this will work out in the design of a flying-wing As you know the Davis airfoil wing has a high aspect ratio and is very thin in front elevation, and it would be a major item to install bombs, machine guns, fuel, not to mention the crew in the wing structure. The Davis wing has been employed on all the new Consolidated Aircraft designs. The company will operate from Los Angeles, California, but there are no signs as yet as to where its factory will be built.

Following the end of the National Air Races last year we brought you word that William Schoenfeldt had organized the 20th Century Aircraft, Inc. Now we have the details. It was William Schoenfeldt who put the "Firecracker," Menasco-powered racing plane, into condition so it could produce such astonishing speeds under the pilotage of Tony LeVier last year. Associated with Schoenfeldt in the company is Keith Rider, who originally designed the "Firecracker," and many other racing planes of note. The third big racing name in the concern is Roscoe Turner.

Their first product: a single-place, low-wing interceptor with fully retractable landing gear. Span—36 ft., length—29 ft. 6 in., weight—4,200 lb., horsepower—1,200. A radial engine will be up forward. Like many an aircraft company, 20th Century will use the plastic process. Other companies developing wood construction impregnated with a Bakelite composition are Bellanca, Waco, Howard Hughes, Timm, Bennett, Bowlus and a couple of others that do not know if they will be able to stand the ordeal of trying to get themselves established in the industry. Keith Rider has now had plenty of experience at building "plastic" airplanes and should know by this time if the idea is practical.

Two good features of these oven-baked airplanes are their light weight and ultra smooth finish. But there are always skeptics to a new thing and we are one of them in this instance. Can these plastic airplanes be built as fast as the manufacturers say they can? We challenge that question and also the one as to cost, but we would like to know definitely.

There are now two airplanes in the United States that are very similar in appearance and performance—one, the NA-35, the design of which has been purchased by Vega from North American and the other, the Timm low-wing two-place, open cockpit trainer. The NA-35 is all-metal throughout, and the Timm plastic throughout. Nothing has been heard of late of much activity at Timm's new plant and Vega has yet to build their $3,000,000 factory next to the Burbank, California Airport, thus it appears that both companies will go into production at almost the same time on their respective airplanes, and therein lies the proof of metal against plastics. Well, we will stick our neck out and predict that the metal airplane will beat the plastic job AT LEAST three-to-one in production and at lower cost! In the higher performance category that statement might be more questionable, but now is the time for the plastic plane builder to prove his claims and the more power to him if he can. William Schoenfeldt has certainly shown his ability in the perfection of the "Firecracker" and this new creation of his has the makings of one of the outstanding planes of the year. But will these plastic ships eat into the all-metal market? The 20th Century pursuit will have a speed of about 350 m.p.h.

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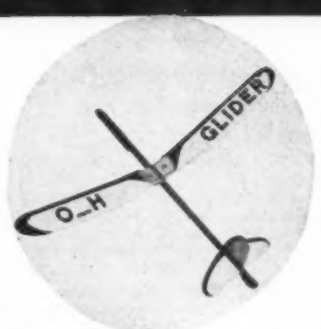

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Left: Model folded, ready to launch, to altitudes of 60 to 100 ft.

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Just what Howard Hughes is doing in the plastic field is one big question mark, but it is known that he is going ahead with activities and has taken on more engineers to speed the design. Another new company is National Aviation, Inc., which has yet to make known its intentions in the manufacturing field.

A Record-Breaking Helicopter

(Continued from page 31)

The construction details must be followed very carefully in order to insure the desired results.

Motor Stick

Select a piece of slightly over-sized 1/64" sheet and sand it smooth. Cut out a blank 1 1/8" x 10" and bend it around an 11/32" dowel rod. Be sure that the seam is not out of line and the tube is not bent, because the tube has to revolve under power and if it is out of line the model will not be stable. Reenforce each end of the tube with 1/2" additional 1/64" sheet to take care of handling. Cut a notch at each end of the tube 3/64" x 1/16" to keep the plugs from spinning on the tube. Use quarter-grained stock as it is stronger for its weight than straight-grained. The cross section should be perfectly round.

Vertical Fins

Three vertical fins are employed and are made of 1/64" square balsa throughout. They should be spaced evenly with 120 degrees or 2 1/4" between each tip. A small paper hub with an inside diameter of .014 is placed at the top and the bottom of the upper part of the vertical fins through which the .012 wire fits. Bend the end of the wire at right angles after the vertical fins are put on to keep them from falling off. The tail plug is made from a small piece of 1/16" sheet, and the rear hook is bent from .016 wire. Put a small piece of 3/64" x 1/16" balsa on the rear plug to fit the notch in the end of the tube. Be sure the fin boom and the fin is "trued up" in order that the model is stable.

Propellers

Two propellers are used, one right-handed and one left-handed. Use rather heavy, straight-grained, indoor wood on the props as they are under a constant strain and take a great deal of abuse. First secure a block 1-1/4" x 7/16" x 14" and carve it convex, or just the opposite from a regular propeller: making one left-handed and one right-handed. Join the halves together so that you have one complete right-handed prop and one complete left-handed prop. Balance the props and insert a shaft, nose plug and washers in the right-handed one. Cut the left-handed prop in the center and put it on the tube 1" from the top. Be absolutely sure that the pitch is correct and the prop is not out of line, for if these settings are not correct the entire flight of the model will be ruined. Two tungsten braces are used on the left-handed prop to keep it from flaring too much and hitting the top propeller. Also put on two 1/32" square braces from the first panel to the motor stick. Cut small notches in the prop and the tube, making sure they are the right distance apart, as shown on the plans. Cement the tungsten and be certain you do not change the pitch in either blade.

Covering

The model is covered with light microfilm on the vertical fins and with heavy film on the props. Cover each of the three fins separately before joining them and be sure that they are not warped. Covering is done by applying saliva to the surfaces, placing them on the film, and trimming with a hot wire or acetone. Each prop half can be covered in one operation if you are careful and experienced; if not, cover three or four panels at a time to insure the same prop pitch as the framework had before covering.

Assembling and Flying

Make sure that the prop plug and the vertical fin plug fit snugly and straight in the motor tube; then take them off and slip a 10" loop of 5/64" x 1/30" brown rubber through the tube. If you experience difficulty, put the loop through the tube by making a small wire hook about 12" long. Place the top propeller in position in the tube with one end of the loop on the shaft and the other end protruding from the tube. Give the model about 300 turns and then put on the rear plug. Hold the model with the top prop in your right hand and the tube 3" from the top in your left hand. Remove your right hand, letting the top prop spin. Check it and see if it revolves smoothly. If it does, release your left hand gently in order to keep from crushing the tube. The model should maintain its altitude for a few seconds.

If the model flies steadily give it 500 turns and launch in the same manner. It should climb vertically about 30 or 40 feet, maintain its position for a few seconds and then steadily come down without jolting from side to side. If the model does not climb on this amount of power, carefully decrease the pitch in both props a slight amount, making sure that the pitch decrease is uniform. Slowly increase the number of turns and at the same time note the behavior of the model. The only difference should be a faster climb. If the model acts unstably then the propellers or the vertical fins are out of line. Duration of more than two minutes should not prove difficult to

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even the beginner. However if you should experience any difficulty in the flying or construction of this unique model, write to the author, care of MODEL AIRPLANE NEWS. Enclose a self-addressed, stamped envelope and we will endeavor to answer your problems.

Gas Lines and Air Ways

(Continued from page 50)

Texas

Bill Tanner of the *"Amarillo Times,"* Amarillo, Texas, writes:

"Two fifteen-year-old boys walked off with all the honors in Frank Davis' annual model airplane circus held southeast of Amarillo on Sunday, June 16.

"Ralph Loveland won the PDQ contest with a seven-foot ship powered by a Cyclone engine . The PDQ, as handled in Texas, starts with all engines dead, and the first ship into the air under its own power is determined as winner.

"A few moments later Loveland's plane headed out to the northwest, very high after a 20-second motor run, finally vanishing after an official flight of 16 minutes. His other times were relatively low, giving him a winning average of 5:20 in Class C competition.

"Denny Davis, after sweeping the rubber-band powered event, walked off with first place in Class B, with an average time of 1:40, eight seconds less than his average rubber-band time.

"Edwin Ridings, with 2:24, and Z. C. Collier, with 2.05, were other strong Clasc C contenders.

"Denver and Wichita Falls were represented by planes. Competitors who finished all events included H. N. Garreston, Merl May, Ralph Loveland, Denny Davis, Ross Radey, Z. C. Collier, Junior Gray, Floyd Stivers, Phillip Mosko, Edwin Riding, and Lilburn Ray."

Cuba

Apparently gas model activities are not confined to the United States these days, for we hear from an old friend, Arturo Espinosa Roque of the Federacion Aeromodelista de Cuba, San Miguel 407, Habana, who says:

"On last May 26 was held the first gas model plane contest in Cuba. It was organized by one of the clubs that now exist in Havana, the Federacion Aeromodelista De Cuba, and there were also contestants from the Club Aereo Cubano.

"That morning at half past eight everything was ready, about 25 models and 12 rubber models, many spectators (in fact too many) and many cars, including two motion-picture trucks. But when it was going to start, the first full-sized shower of the year came, and although it lasted only a few minutes, it left a brisk wind that was the reason of some crack-ups. Several of them were caused by crashes against people who were placed in strategic points to see the best of the take-offs. And they also *felt* them!

"In the rubber-power event there was only an open class, for models of any size. There were absolutely no thermals, and so the best flight in the rubber class was 1:27, and in the gas class 2:40. The rules in the rubber class were: hand launch, three official flights with a minimum permitted time of 20 seconds, to select the winner by adding up the three times. In the gas class, we had unassisted take-off, to take the average of three official flights. The motor run was computed by the formula:

$$T = \frac{4.5\,W}{d},$$

W being the weight in pounds, ready to fly, *T* the number of seconds allotted, and *d* the motor displacement in cubic inches.

"I proposed this rule because we have still relatively few gas models in Havana, and in order that all of them could compete together with the same chances we had to devise a rule that would take into account the weight and motor displacement. The rule worked all right. The results were as follows:

Gas Event

Place	Name	Time
1.	Andrés Abello	1:34.8
	(Prize, DGND'S Trophy and Brown D.)	
2.	Jorge Luis Hevia	1:31.1
	(Precision watch.)	
3.	Raúl Fumagali	0.55.3
	(Prize, fountain pen and pencil.)	

Rubber Event

1.	Peña	213 sec.
	(Prize, Commander kit.)	
2.	Jorge Núñez	168.5 sec.
	(Prize, gold medal.)	

DGND means Dirección General Nacional de Deportes, or National General Direction of Sports, an official institution intended to help the development of all sports in Cuba. The Brown D motor was donated by the Compañía Nacional Cubana de Aviación, S. A., the watch by Colonel Pedraza, Chief of the Army, the pen and pencil by Lieutenant Colonel Bernardo García, the Commander kit by "Cuba Aérea," a model shop, and the medal by the Federación Aeromodelista de Cuba."

Pennsylvania

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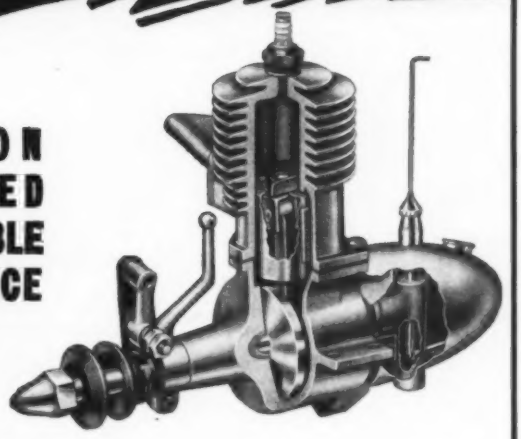

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Gas Model Airplane Association held their regular monthly meet at Northeast Philadelphia Airport, Red Lion Road just east of Roosevelt Boulevard. The day was very calm with a noticeable absence of thermals. At many times throughout the meet it looked like we might be washed out, but the rain held off.

The total entries numbered 16 and an estimated attendance of 300 spectators. Three ships went out of sight, two of which were recovered by the end of the meet. There were only three major crack-ups out of the 40 some ships flown.

The final results were:

1. William Young, West Philadelphia ..... 1.51 sec. average
2. Harry Appoian, West Philadelphia ..... 1.23 sec. average
3. Gerald Obschlager, Busleton..... ..... 1.08 sec. average

Winner of the special $5.00 award for the Quaker City member with the highest time was William Young. Harry Appoian won $3.00 for Quaker City member with the second highest time and Gerald Obschlager won $2.00 for third highest time.

New Hampshire

The annual Inter-State contest sponsored by the Nashua Cloud Chasers was held on June 30th at the Municipal Airport. There were over sixty entrants who participated in spite of the high wind which prevailed most of the day.

The winners were as follows: Class B: L. M. Burke of Everett, Mass., 2:56; Al Corey of Cambridge, Mass., 2:50; David Pinel of Quincy, Mass., 2:12; Joseph A. Belanger of Nashua, N. H., 1:52; Harvey Gardner of Melrose, Mass., 1:25. Class C: Leonard Day of Salem, Mass., 3:07; Maurice Laliberte of Nashua, N. H., 3:05; Gordon Smith of Quincy, Mass., 2:37; Robert Puglisi of Wakefield, Mass., 2:03; Peter Tamulonis of Nashua, N. H., 1:54; John Carpenter of North Saugus, Mass., 1:47; Oliver Gardner of Melrose, Mass., 1:44; Kenneth Hylm of Worcester, Mass., 1:14; Louis Chapman of Laconia, N. H., :55; Walter Parras of Lowell, Mass., :54. A prize for the longest single flight was won by Leonard Day with a time of 1:43. There was no recorded flight time for planes in Class A because of the high wind.

Prizes were donated from Philip Morris Company of Nashua, N. H., Gate City Model Shop of Nashua, N. H., Baycraft Miniature Motors of Boston, Mass., Comet Model Airplane and Supply Company, Scientific Model Airplane Company, Modelcraft, Berkeley Models, Inc., Nathan R. Smith Mfg., Austin-Craft Company, Trexler Balloon Wheel Company, and Burgess Battery Company.

A colored movie film was taken during the meet and it is expected that it will be shown to the various model clubs throughout New England.

During the early part of the contest Robert Puglisi of Wakefield test hopped his ship and it was ensnared into one of those beautiful thermals—Roberts face wore a pretty sad expression as he watched his beautiful model start on its cross-country flight to parts unknown. Not an half hour later a call was received at the airport that a plane had landed in the city on Mr. Carter's estate, the only green lawn around. Not a scratch could be found on the model and so Robert continued to strive for one of those prizes, which he succeeded in winning. The flight was over ten minutes when it was out of sight, why don't they do that when it is in an official flight—Oh well!

Colorado

Ed. Radebaugh, publicity director of the Denver Gas Model Club, 1443 Welton, writes:

"Here is more news about this agressive group. Our Club Officers are as follows:

"Frank Corbin, Jr., President. Gordon Peecher, Vice President. Wm. Yaich, Secretary-Treasurer. Ed. Radebaugh, Publicity. Field Committee: Don Griffith; Gordon Peecher. Membership Committee: Warren Nelson; R. C. Sarsfield.

"We officially named the flyers of the club the 'Yellowjackets.'

"In the past six months we have been actively engaged in many phases of model aviation. One of the most outstanding of these activities was the exhibit at the Denver Hobby Fair, in which we were the only club exhibiting model airplanes. There were several unusual features shown. In addition to several gas and rubber powered models, there was an all metal wing section and motor exhibits consisting of both assembled and disassembled motors mounted on display boards. These may be seen in the pictures. A motor was also mounted on a test block and run periodically in order that the pub-

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lic might see how these motors perform. It proved a very effective means of drawing huge crowds to our booths.

"One other very interesting feature was the weight guessing contest, in which we placed a 3" x 6" x 3' balsa block on a table so the spectators could estimate the weight before depositing their guesses in a box. Those guessing most nearly correct were awarded airplane kits which were donated by local model dealers.

"Out of nearly 1,000 cards deposited we have developed a valuable list of model enthusiasts. There were around 15,000 spectators checked through the show during its six days duration. Experienced attendants acquainted these people with what we are doing as a club to promote this interesting hobby and were also given descriptive folders telling of the hobby and its activities. Several issues of MODEL AIRPLANE NEWS were effectively displayed throughout the show and used by the attendants in explaining the various phases of this growing hobby.

"After a long and arduous search for a desirable club flying field we have made a three-point landing at East Hampden and Forest Avenue on what is to be the future airport of the 'Yellowjackets.' The field is to be supervised for the safety of the spectators as well as the flyers by our field committee mentioned above.

"Any model airplane builder in this vicinity is invited to use our field and may do so by merely registering his ship with the field committee."

Connecticut

Jules V. Agne, 115 York Street, New Haven, writes the following of the Elm City Gas Bugs of this city:

"Our club is rapidly becoming one of the most active in New England, not only in promoting fellowship among its own members, but also in sponsoring the most important meet in the state of Connecticut. This meet, the Conn. State Championships, will be held on Sep. 29 at the New Haven Municipal Airport.

"This meet is held twice annually, the fall meet being for the state titles. At our last meets, we have had over 110 contestants from all parts of New England, New York, and New Jersey; 5,000 spectators throughout the day. The Fall meet promises to be bigger and better than any previous meet as we have the Chamber of Commerce approval and are soliciting trophies and prizes from our local manufacturers.

"There is also a move at the present time to form a state-wide organization of all the Model Clubs throughout the state. Inquiries can be made to our club concerning this."

Michigan

Harold E. Hawkins of 316 N. Blackstone Street, Jackson, Michigan, tells us that Jackson has two model clubs, a senior and junior. Recently Mr. Harvey Castle of 1626 E. Michigan Avenue won Class A at the Battle Creek meet and James Lindemuth of 329 Van Buren Street won fifth place in Class A at the Fort Wayne meet. Though the clubs have not been organized long they are extremely interested in the game and are determined to "go places."

Pennsylvania

At the recent meet held at the Harrisburg, Pa., Airport, Lawrence Cook of 620 S. 20th Street, Harrisburg, won the MODEL AIRPLANE NEWS award for the best official flight in the Rubber Event. His only flight was 5 min. 28 sec. out of sight due to a gusty wind.

New York

Frank Zaic of 100 East 10th Street, New York City, writes:

"For New York and vicinity 'Academy Record Trials' will be held on the last Saturday of every month, ending on October 26. Rain date on the following Saturday. All listed events, except gas models, will be timed for possible record flights. R.O.W. tank will be provided but the fliers will have to fill it up themselves. Place: Creedmore, L.I. Time: From 10 a.m. until 5 p.m. Only Academy members will be timed. No prizes. We will not be able to answer questions by mail. Official observer and timer: Frank Zaic."

Here are a few "Moon-beams" from Carroll Moon:

"The second annual gas model contest of the Sky-Scrapers Model Club will be held Sunday, September 22, at Creedmore, L. I. A.M.A. rules will apply throughout and the contest will be sanctioned by the Academy. Events will be Classes A, B and C. Prizes will consist of trophies, motors, merchandise, with ten or more awards in each event. Entry fee of 50 cents will entitle participant to enter in any one or all events. The Sky-Scrapers are an A.M.A. Chapter and are I.G.M.A.A. Unit No. 2. Over 100 entries were recorded in the 1939 contest and advance inquiries indicate that there will be many more this year. Last year's contest was featured by the flying of Henry Struck who won first in Class C and High Single Flight honors for the day with the KGS. For information and entry blanks write: Carroll Moon, Senior Director, 473 E. 9th St., Brooklyn, N. Y.

"The Sky-Scrapers Model Club recently elected officers to serve throughout the remainder of the year. George Gilchrist was elected president, Sal Taibi was reelected vice president, Zeeley Gerber was chosen as secretary and Art Mansfield was named treasurer. At the 1940 Nationals the Sky-Scrapers performed extremely well, taking home many honors. Leon Shulman won first in Class A and third in Class B. Phil Fruchtman took second in Class A and Joe Raspante scored a third in Radio Control. Jerry Stoloff took fifth in Class A while Howie Beitchman and Maurice Schoenbrun tied for eighth in Flying Scale. Sal Taibi took tenth in Class A."

California

On September 22, starting at 7:30 a.m., the Arrowhead Aeronautics Gas Model Club will conduct the Official California State

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Championship Gas Model Airplane Contest. It will take place at the Shandin Hills Airport, San Bernardino, and will be sponsored by the San Bernardino Exchange Club. All those who wish to attend should write Harris E. Matthews, c-o Harris Company, San Bernardino. The first annual contest held by this club, last December 3, drew 330 entrants and over 5,000 spectators.

Tennessee

The Tennessean's Model Airplane Meet held on Sunday, June 23, was a great success in many ways. We had 130 entries from seventeen Tennessee cities from Memphis to Bristol, from Alabama and Kentucky, an increase of twenty-five over last year. An estimated crowd of 15,000 people streamed in and out all day. But a very high wind, which never let up from 8 a.m. to 5 p.m. played havoc with models.

Winner of the Grand Prize, an all-expense trip to Chicago by commercial airliner to fly in the National Meet in July, was James Robinson, young employee of the Stinson Aircraft plant here in Nashville who with two flights made an average of two minutes and fifty-four seconds. His plane was lost after the second flight.

Massachusetts

The Boston Gas Model Association has provided a permanent clubroom and workshop with power tools for the convenience of all model builders. It is located at 202 Dartmouth Street, Room 9, Boston. Club meetings are held on Friday nights at 7:30 p.m. This association sponsored the recent New England Championship Gas Model Meet and hopes to continue sponsoring of many contests.

Fundamentals of Gas Model Engines

(Continued from page 11)

through which it enters the float chamber "T." As the gas fills the chamber, the float "F" is immersed in it. At a certain level the float "F" is pushed upward. This reacts on the lever "M" pushing the needle of the valve "Y" into the valve seat in the pipe "N" leading from the gas tank. In this manner, the valve is closed and the gas supply to the carburetor is shut off.

The purpose of a carburetor is to mix gasoline and air together in proper proportions. A hollow jet "J" is screwed into the float chamber with an opening at its lower end so that gas may pass from the chamber up through the jet. The gas being at a certain level in the chamber it also will be at the same level in the jet. This point is marked "H" in the diagram. The tip of the jet as shown in the diagram projects upward into the air intake tube "L."

As the piston rises in the cylinder causing a suction in the crank case a vacuum is produced in tube "L." This suction is transmitted to the end of the jet "J" and draws gas out of the end of the jet as well as air in through the open end "A" of the air intake tube. As the air rushes in the end of the tube and passes upward through it past the end of the jet, it mixes with the gas spraying out in the form of fine vapor from the jet, forming an explosive mixture. This, as in the case of the mixing valve, is drawn into the crank case of the engine. The carburetor makes it possible to carry a large volume of gasoline in the auxiliary tank. This would be impossible in the case of a mixing valve as the drop in the level of the gas in an extremely large tank would be excessive.

Spark Generating System

One of the most important parts of the gas engine is the system which produces the electric current and the spark which fires the explosive charge in the cylinder. There are several units of equipment which are required as follows:

(1) Batteries to generate the current; (2) coil which changes the current from low voltage to high voltage; (3) the condenser which stores the charge of electricity and causes an oscillating current to flow through the coil; (4) the timer which makes and breaks the current from the batteries at the proper moment and by so doing induces a fluctuation of the current in the coil; and (5) the spark plug at which the spark is produced by the high voltage current from the coil.

Figure 8 shows the diagram with the various units and the system of wiring by means of which they are connected. Before an explanation of the system as a whole can be given it is necessary to understand thoroughly the functioning of the various units. First, the coil. This is composed of a metallic magnetic core about which a few coils of large gauge wire are wound. This is called the primary circuit. One end of it passes out from the coil at "E" to the battery at "P." The other end of the circuit passes from the coil at "F" to the breaker points at "P." When these points are closed, the current flows from the battery through the primary of the coil through the points "P" to the ground. From the ground it flows back into the battery. Around the primary winding in the coil is wound many turns of fine wire called the secondary winding. One end of this winding is connected to the ground, the other end

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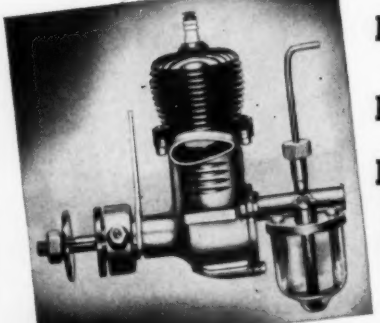

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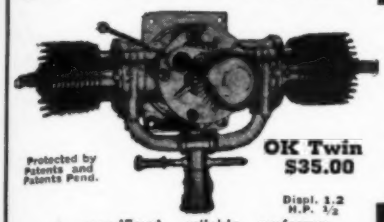

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passes out of the coil at "G" to the spark plug "S." Within the coil a low voltage current, passing from the battery through the primary, induces a high voltage current in the secondary winding. This is done by the application of basic electrical principles. Namely, if there is a fluctuation in the current in the primary winding there will be a change in the number of lines of force passing through and around the secondary winding. This change induces a current in the secondary. Due to the fact that there are a fewer number of turns in the primary but many in the secondary the voltage of the secondary current is much higher than in the primary. In fact, the secondary voltage will be increased in proportion to the number of turns of wire in the secondary there are for every turn of wire in the primary.

Now the problem is to cause a fluctuation in the current through the coil. Obviously if the batteries are hooked to the coil directly, the current will be steady through the primary and induce no current whatsoever in the secondary. The fluctuation required is caused by the breaker points and the condenser. You will note that the condenser "K" is shunted across the breaker points "P," that is, one pole of the condenser is attached to the wire leading from the coil to the breaker points and the other pole is attached to the ground. There is no direct circuit through the condenser. However, any difference in electrical intensity existing between the two poles of the condenser causes the condenser to be charged. In simple words, it may be said that the condenser absorbs and holds a charge of electricity.

For the greater part of the revolutions of the crank shaft, the breaker points "P" are open so that no current flows from the batteries through them. At the proper moment, these points are closed by a cam on the crank shaft. When closed, the current flows from the battery through the primary of the coil and through the points. The flow of current neutralizes the difference in the potential between the two poles of the condenser. At the moment that the spark is to be created the breaker points suddenly open shutting off the current from the battery. This in itself causes a change in the flow of current through the primary of the coil, thus inducing a high voltage current in the secondary. However, the amount of change in the flow of current is comparatively small due to this alone. The effect of this change on the condenser causes it to vibrate or fluctuate the current violently in the primary.

The action may be explained as follows: As the breaker points open, shutting off the current from the battery, a sudden change in the potential between the two poles of the condenser causes a violent surge of electrical charge into the condenser. The condenser so as to speak becomes suddenly overcharged causing a reaction to expel this charge. The breaker points being open, this charge passes back through the primary circuit of the coil. This discharge causes a reactionary change again in the condenser. An oscillating current, therefore, is induced in the primary circuit. Because of this, many current pulsations flow backward and forward many thousands of times through the primary causing an infinite number of changes in the lines of force cutting through the secondary. In turn, these changes induce the high voltage current in the secondary which passes to the spark plug. All of this action is instantaneous, taking place at the speed of light (286,000 miles a second). Figure 9 shows the breaker points of the condenser and the cam on the shaft which closes and opens the points as it rotates.

Possibly some readers have wondered why the current of the batteries, or battery, cannot be attached directly to the spark plug. The voltage of the battery, which is approximately 1-1/2 volts when two cells are used, is not sufficient to cause the current to jump the gap between the spark plug system and thereby produce a spark. Voltage is equivalent to pressure. In other words, the voltage

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UP TO $5.00 for your old motor. Write, giving description of your old motor and type of new engine desired, for liberal trade-in allowance. United States Model Airplane Co., 44 Oakland Terr., Newark, N.J.

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TOW-line Launched soaring gliders. Send for free illustrated descriptive folder to T. Hoehn, 38 N. Plum St., Lancaster, Pa.

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AIRCRAFT ILLUSTRATIONS

AUTHENTIC Detailed Aircraft Sketches, 9½" by 12½". Send 10c for sample and catalogue. Craft Art Company, Dept. 10M, 246 Fifth Avenue, N. Y. C.

must be so high that the pressure is strong enough to jump the spark gap. This high voltage is produced in the secondary of the coil and is great enough to jump across the spark plug points. In so doing, a great heat is generated due to the resistance of the air gap between the points. This creates a spark.

Considerable current is used up when it passes through a wire. The longer the wire, the greater the drop in the current between one end and the other. Therefore, to obtain the greatest efficiency from your gas model electrical unit, it is wise to keep all wire leads connecting the various units, such as, battery, coil, etc., as short as possible.

Usually it is necessary to insert a switch in the system to turn the current on and off as desired. This switch should be inserted in the primary circuit between "E" and "P."

If the small batteries which supply the current to the engine during flight are used to start the engine, considerable current will be wasted. Therefore, it is the practise to attach large booster batteries in the circuit while starting them. These supply the current for starting and are disconnected after the engine is running. The current is then supplied by the small batteries. In attaching booster batteries, they should be connected in the circuit as shown: shunted across the small battery "B." "A" and "B" represent the minus and plus terminals or plug-in jacks for the booster batteries. The positive is attached to the wire passing from the positive pole of the battery "B" to the coil. The negative jack "A" is attached to the negative side of the battery "B" at "D."

These articles have outlined the principles of gas model engine operation upon which the design and construction of all engines are based. The difference between the various ones on the market lies only in the size and arrangement of their various elements.

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Flash News

(Continued from page 35)

immediate reorganization plans have been announced and, for the time being, Stinson will do a large percentage of the company's sub-contracting work.

A new aerial torpedo which "can't miss," in the words of its inventor, J. Robert Fish of Springfield, Massachusetts, has been shown to the War Department, who reserved comment. The torpedo, which is similar to marine types with the exception that it is rocket powered, is fired to a specified height where "it sprouts wings and goes for the nearest plane guided by sound-sensitive ears."

Pitcairn's new "all-purpose" aeromobile" has been successfully test flown. Sleek and well streamlined, the new ship features completely enclosed side-by-side cabin, three wheel drive for use on the highway, and power-driven rotors to assist take-offs in the manner of a heliocopter. The ship literally leaps vertically into the air and gets under way within the momentary pendulum action noted on previous types. It can be landed on a ten foot square piece of cloth.

New manufacturers: Don Frye, former personnel manager for Consolidated and brother of Jack Frye of TWA, will enter the two-seat low-wing light training plane market early this fall with a new plant in the Lower San Diego Bay district. The plane will be for the commercial flight training school market. Doak Aircraft, organized by E. J. Doak, formerly treasurer for Douglas, will build a similar 65-horsepower ship to be followed by a 165-horsepower medium trainer early next year. General Aircraft Corporation, who have bought out the rights and titles of the old company, will begin production soon in their new Southern California plant. The type of ship has not yet been announced. Cyclops Aviation is in the process of organization and plant construction and Hardman Aircraft Products are now adding 20 men per day in preparation to begin construction of a light training plane.

Ryan Aeronautical Corporation of San Diego has received an order for 64 training planes to be equipped with both land-gears and floats amounting to eight hundred thousand dollars from the Netherlands' East Indies. Menasco has received an order for 72 150 horsepower aircooled in-line engines to power these ships.

First of Consolidated's huge four-motored XPB2Y-1 patrol-bombers will go into service with Patrol Squadron VP-12 under the command of Commander S. B. Cook. The ships have a range of five thousand miles carrying a crew of nine and several tons of bombs. They have a speed in excess of 200 miles-per-hour and the completed order for 18 is expected by late Fall. After a 6-months' service test, bids will be requested for a large number to replace the smaller but far-famed PBY-1 series.

Douglas' order for parachute troop transports, which we announced exclusively in these pages last month, will be known as C-47 transports and the War Department has already begun the training of parachute troops on a large scale to equip these ships at Highstown, New Jersey, home of the 29th Infantry.

Advanced as a possible solution to the aeronautical engineer bottle-neck, Lockheed Aircraft in cooperation with the California Institute of Technology Gugenheim Foundation for Aeronautics, has opened the first class to 120 students each of whom have had from 6 to 10 years engineering experience in machinery, bridge, tool machine, etc. design, in aeronautical engineering and detailed aircraft structural design. The brush-up course will last for 16 weeks after which each engineer will be employed by Lockheed in their engineering department, which already boasts a roster of one thousand, at salaries commensurate with their position in the engineering industry.

Warner Aircraft Corporation of Detroit has received an order for 250 "Super Scarab" 165 horsepower radial air-cooled engines at a cost of $700,000, for the British Purchasing Mission to power the "Wackett" training planes now being built in Australia.

The War Department will build no aircraft plants of its own, according to a recent announcement from Washington.

Filling in a badly felt training need, the Air Corps has awarded a contract for $900,378 to Cessna Aircraft Company of Wichita, Kansas for twin-engine "transition" training ships of the twin-engine type. The gap between basic training ship and huge front-line high speed bomber is now bridged.

Ordered by the Army: $1,488,272 worth of Wright "Cyclone" model R-1820-65 one-thousand horsepower radial engines.

Ordered by the Navy: $3,779,628 worth of Stearman biplane primary trainers to be designated N2J-1; to Continental motors, $1,442,275; to Lycoming motors, $1,541,448.

The commercial aviation industry was recently shaken to its boots when Rep. Melvin J. Mass (R., Minn.) of the House Naval Affairs Committee, stated that: "There is no question but that the Army will take over regulation of airlines, control of traffic and purchase of equipment. The Navy is going to take over Pan American Airways, I know that damn (sic) well!" In the event such a move is undertaken, one of the greatest battles in aviation history can safely be predicted. Let our airlines SERVE our citizens, let our air forces PROTECT them!

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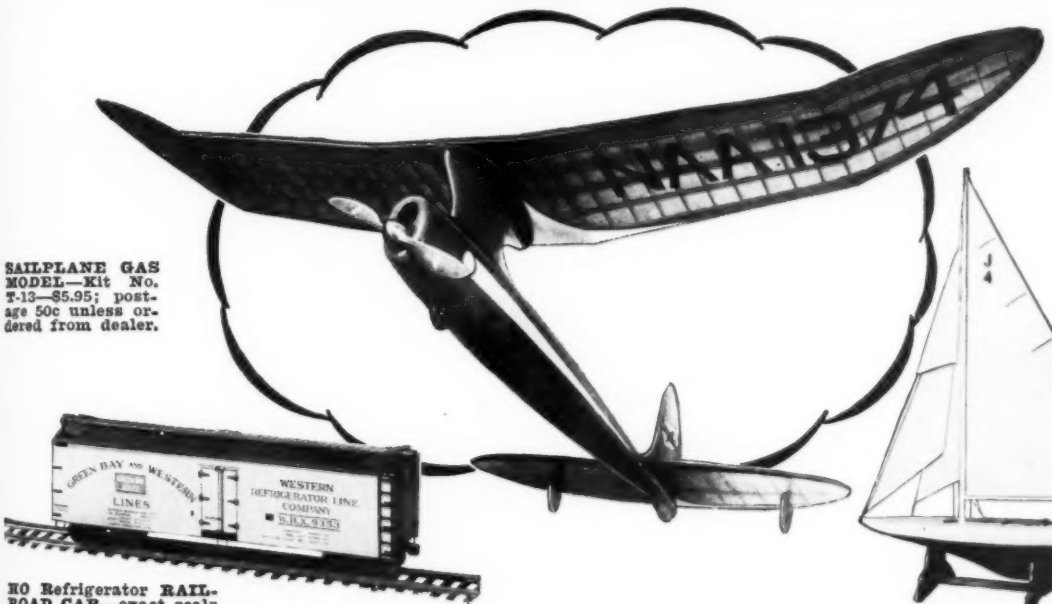

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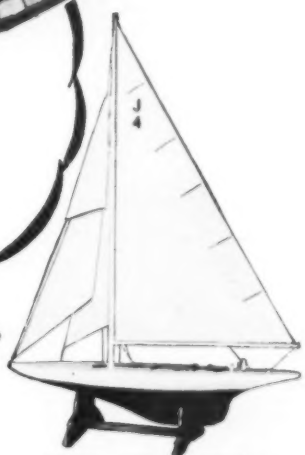

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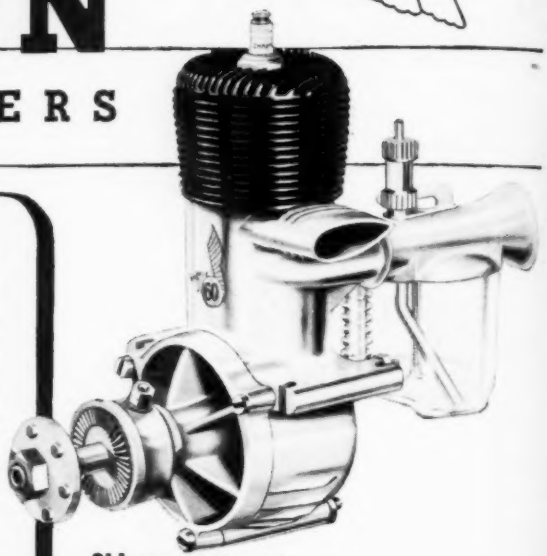

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